1156SBG000AA

EP5000/EP4000

GENERAL, MECHANICAL/ ELECTRICAL

1151SBG000D

SAFETY INFORMATION

(ALL Areas)

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the manufacturer.
Dispose of used batteries according
to the manufacturer's instructions.

(Denmark only)

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

(Norway only)

ADVARSEL

Eksplosjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende
type anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens
instruksjoner.

(Sweden only)

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(Finland only)

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä Käytetty paristo valmistajan ohjeiden
mukaisesti.

1149SBG000BA

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GENERAL

1156SBG0100A

1 SPECIFICATIONS

TYPE : Console (with Stationary Platen)

PHOTOCONDUCTOR : Organic Photoconductor

COPYING SYSTEM : Electrostatic Dry Powdered Image Transfer to Plain Paper

PAPER FEEDING SYSTEM : 3-Way Feeding
- 1st Drawer: Fixed Paper Size Tray (500 sheets of paper, USA Area: 550 sheets of paper)
- 2nd Drawer: Universal Tray (500 sheets of paper, USA Area: 550 sheets of paper)
- Multi Bypass Table (50 sheets of paper)

EXPOSURE SYSTEM : Mirror Scanning, Slit Exposure

DEVELOPING SYSTEM : New Micro-Toning System

CHARGING SYSTEM : Comb Electrode DC Negative Corona with Scorotron System

IMAGE TRANSFER SYSTEM : Visible Image Transfer by means of a Single-Wire DC Negative Corona with Corotron System

PAPER SEPARATING SYSTEM : Single-Wire AC Corona with Corotron System, plus Paper Separator Finger

FUSING SYSTEM : Heat Roller

PAPER DISCHARGING SYSTEM : Charge Neutralizing Brush

MAXIMUM ORIGINAL SIZE : Metric-A3L; Inch-11” 17”L (L: Lengthwise)

COPY MEDIUM

		1st Drawer (Automatic feeding)	2nd Drawer (Automatic feeding)	Multi Bypass Table
Mec	Plain paper (60 to 90 g/m^2)	f	f	f
	Translucent paper			f
	Transparencies			f
	Thick paper (91 to 157 g/m^2)			f
	Recycled paper	f	f	f
Dimens	Maximum (Width ¢ Length)	297 ¢ 432 mm	297 ¢ 432 mm	297 ¢ 432 mm
	Minimum (Width ¢ Length)	140 ¢ 182 mm	140 ¢ 182 mm	100 ¢ 140 mm

f : Permissible : Not permissible

MULTIPLE COPIES : 1 to 999

WARMING-UP TIME : 240 sec. or less with room temperature of 20°C and rated power voltage

FIRST COPY TIME : A4C or 8-1/2" 11"C: 3.7 sec. or less
(in Full size Mode using 1st Drawer)

CONTINUOUS COPY SPEED (copies/min.): Fed from 1st Drawer
EP5000:

Area	Zoom Ratio / Size	¢ 1.000
Metric	A3L	28
	A4L	37
	A4C	50
	B4L	31

Area	Zoom Ratio / Size	¢ 1.000
Inch	11" 17" (L)	28
	8-1/2" 11" (L)	39
	8-1/2" 11" (C)	50

L: Lengthwise; C: Crosswise

EP4000:

Area	Zoom Ratio / Size	¢ 1.000
Metric	A3L	26
	A4L	34
	A4C	40
	B4L	29

Area	Zoom Ratio / Size	¢ 1.000
Inch	11" 17" (L)	25
	8-1/2" 11" (L)	35
	8-1/2" 11" (C)	40

L: Lengthwise; C: Crosswise

ZOOM RATIOS

	Mode / Area	Metric	Inch
Fixed	Full Size	1.000	1.000
	Reduction	0.816 0.707 0.500	0.785 0.733 0.647 0.500
	Enlargement	1.154 1.414 2.000	1.214 1.294 1.545 2.000
Variable	50% to 200% (in 0.1% increments)		

LENS : Through Lens (F = 6, f = 190 mm)

EXPOSURE LAMP : Halogen Frost Tube Lamp

FUSING TEMPERATURE : 200°C

POWER/CURRENT CONSUMPTION (Copier Only)
EP5000:

Voltage	Exposure Lamp (Rating)	Fusing Heater Lamp (Rating)	Max. Power Consumption
115 V 120 V	80 V 262 W	115/120 V 950 W	1390 W
			1450 W
127 V			1480 W
220 V 240 V	160 V 290 W	220/240 V 1000 W	1410 W
			1550 W

EP4000:

Voltage	Exposure Lamp (Rating)	Fusing Heater Lamp (Rating)	Max. Power Consumption
115 V 120 V	80 V 262 W	115/120 V 900 W	1250 W
			1330 W
127 V			1400 W
220 V 240 V	160 V 290 W	220/240 V 950 W	1360 W
			1500 W

POWER REQUIREMENTS : 115 V, 120 V, 127 V, 220-240 V; 50/60 Hz

ENVIRONMENTAL CONDITIONS

Temperature	10 to 30°C with a fluctuation of 10°C or less per hour
Humidity	15 to 85% RH with a fluctuation of 10% RH or less per hour
Ambient Illumination	3,000 lux or less
Levelness	1° (1.75 mm/100 mm)

DIMENSIONS (Copier Only) : Width .... 620 mm (24-1/2")
Depth .... 740 mm (27")
Height ... 960 mm (37-3/4") (including Original Cover and Paper Feed Cabinet)

WEIGHT : EP5000: (with Paper Feed Cabinet)
123.5kg (272-1/4lbs)
EP4000: (with Paper Feed Cabinet)
122.0kg (269lbs)
*excluding the Copy Tray, starter, toner, and paper

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2 PRECAUTIONS FOR INSTALLATION

J Installation Site

To ensure safety and utmost performance of the copier, the copier should NOT be used in a place:

- **F** Where it will be subjected to extremely high or low temperature or humidity.
- **F** Which is exposed to direct sunlight.
- **F** Which is in the direct air stream of an air conditioner, heater or ventilator.
- **F** Which puts the operator in the direct stream of exhaust from the copier.
- **F** Which has poor ventilation.
- **F** Where ammonia gas might be generated.
- **F** Which does not have a stable, level floor.
- **F** Where it will be subjected to sudden fluctuations in either temperature or humidity. If a cold room is quickly heated, condensation forms inside the copier, resulting in blank spots in the copy.
- **F** Which is near any kind of heating device.
- **F** Where it may be splashed with water.
- **F** Which is dirty or where it will receive undue vibration.
- **F** Which is near volatile flammables or curtains.

J Power Source

Use an outlet with a capacity of 115/120/127V, 1480W or more, or 220-240V, 1550W or more.

- **F** If any other electrical equipment is sourced from the same power outlet, make sure that the capacity of the outlet is not exceeded.
- **F** Use a power source with little voltage fluctuation.
- **F** Never connect by means of a multiple socket any other appliances or machines to the outlet being used for the copier.
- **F** Make the following checks at frequent intervals:
  - **D** Is the power plug abnormally hot?
  - **D** Are there any cracks or scrapes in the cord?
  - **D** Has the power plug been inserted fully into the outlet?
  - **D** Does something, including the copier itself, ride on the power cord?
- **F** Ensure that the copier does not ride on the power cord or communications cable of other electrical equipment, and that it does not become wedged into or underneath the mechanism.

J Grounding

To prevent receiving electrical shocks in the case of electrical leakage, always ground the copier.

- **F** Connect the grounding wire to:
  - **D** The ground terminal of the outlet.
  - **D** A grounding contact which complies with the local electrical standards.
- **F** Never connect the grounding wire to a gas pipe, the grounding wire for a telephone, or a water pipe.

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3 PRECAUTIONSFORUSE

To ensure that the copier is used in an optimum condition, observe the following precautions.

- **F** Never place a heavy object on the copier or subject the copier to shocks.
- **F** Insert the power plug all the way into the outlet.
- **F** Do not attempt to remove any panel or cover which is secured while the copier is making copies.
- **F** Do not turn OFF the Power Switch while the copier is making copies.
- **F** Provide good ventilation when making a large number of copies continuously.
- **F** Never use flammable sprays near the copier.
- **F** If the copier becomes inordinately hot or produces abnormal noise, turn it OFF and unplug it.
- **F** Do not turn ON the Power Switch at the same time when you plug the power cord into the outlet.
- **F** When unplugging the power cord, do not pull on the cord; hold the plug and pull it out.
- **F** Do not bring any magnetized object near the copier.
- **F** Do not place a vase or vessel containing water on the copier.
- **F** Be sure to turn OFF the Power Switch at the end of the workday or upon power failure.
- **F** Use care not to drop paper clips, staples, or other small pieces of metal into the copier.

J Operating Environment

The operating environmental requirements of the copier are as follows.

- **D** Temperature: 10°C to 30°C with a fluctuation of 10°C per hour
- **D** Humidity: 15% to 85% RH with a fluctuation of 10% RH per hour

J Power Requirements

The power source voltage requirements are as follows.

- **D** Voltage Fluctuation: AC115/120/127/220-240V
  □ 10% (Copying performance assured)
  15% (Paper feeding performance assured)
- **D** Frequency Fluctuation: 50/60 Hz □ 0.3%

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4 HANDLING OF THE CONSUMABLES

Before using any consumables, always read the label on its container carefully.

- **F** Use the right toner. The applicable copier model name is indicated on the Toner Bottle.
- **F** Paper can to be easily damaged by dampness. To prevent absorption of moisture, store paper, which has been removed from its wrapper but not loaded into the Drawer, in a sealed plastic bag in a cool, dark place.
- **F** Keep consumables out of the reach of children.
- **F** Do not touch the PC Drum with bare hands.
- **F** Store the paper, toner, and other consumables in a place free from direct sunlight and away from any heating apparatus.
- **F** The same sized paper is of two kinds, short grain and long grain. Short grain paper should only be fed through the copier crosswise, long grain paper should only be fed lengthwise.
- **F** If your hands become soiled with toner, wash them with soap and water immediately.
- **F** Do not throw away any used consumables (PC Drum, starter, toner, etc.). They are to be collected.

NOTE

Do not burn, bury in the ground, or throw into the water any consumables (PC Drum, starter, toner, etc.).

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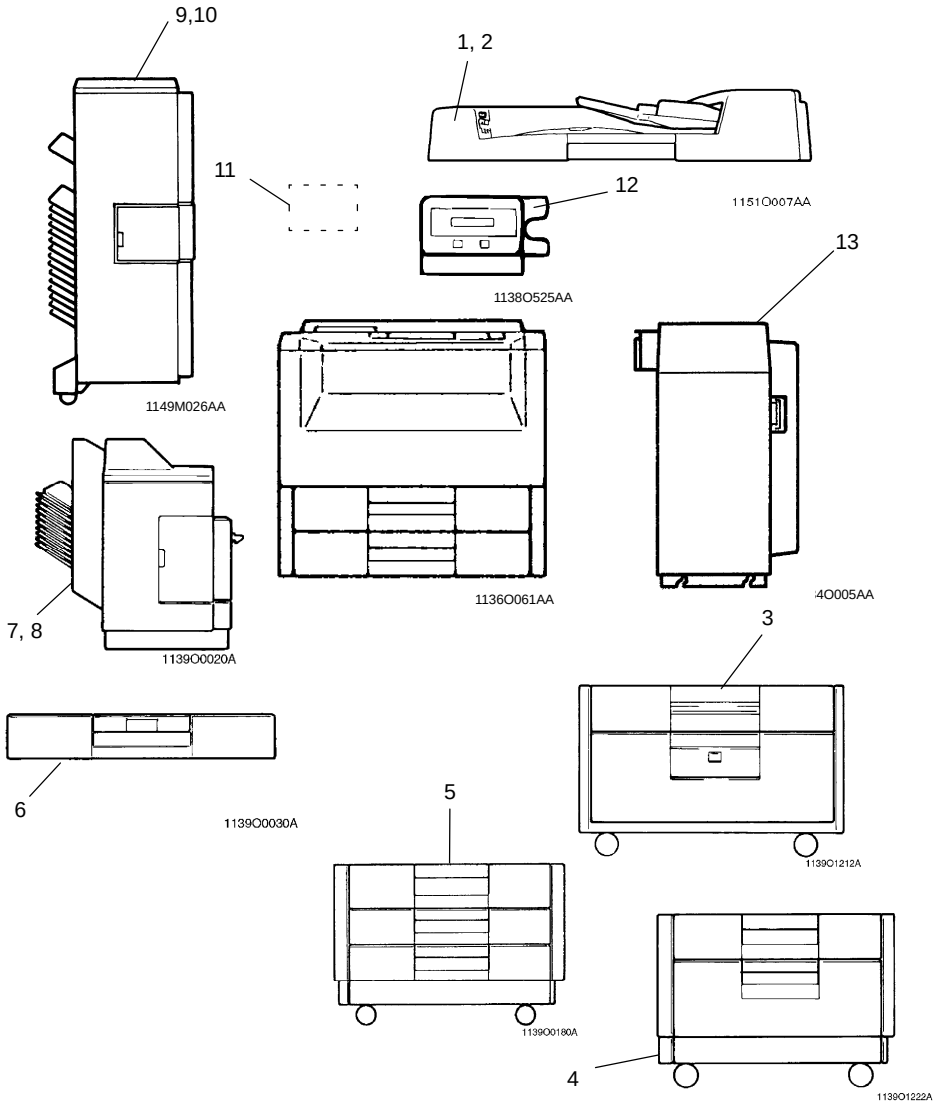
5 SYSTEM OPTIONS



1. Automatic Document Feeder AF-5
2. Duplexing Document Feeder AFR-13
3. Paper Feed Cabinet PF-105
4. Duplex Cabinet PF-5D
5. Paper Feed Cabinet PF-205
6. Duplex Unit AD-9
7. 10-Bin Sorter S-106
8. 10-Bin Staple Sorter ST-104
9. 20-Bin Sorter S-208
10. 20-Bin Staple Sorter ST-211
11. Data Terminal
12. Data Controller D-102
13. Large Capacity Cassette C-301

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MECHANICAL/ ELECTRICAL

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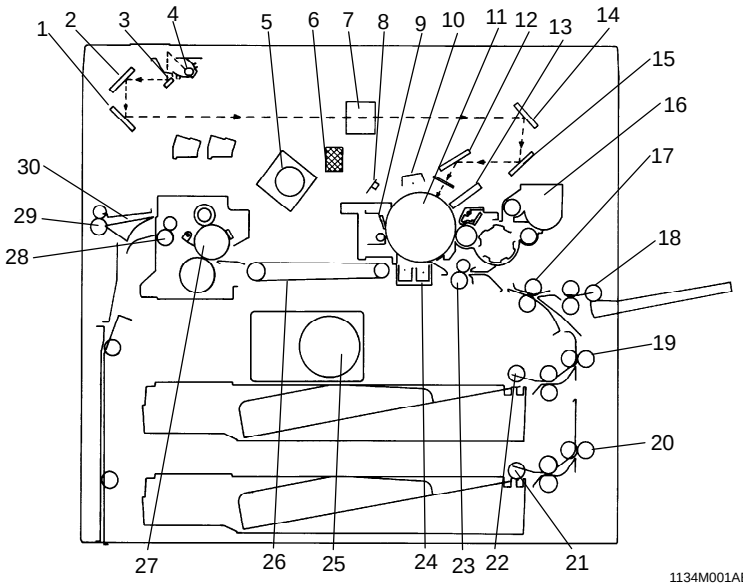
1 CROSS-SECTIONAL VIEW



1. 3rd Mirror
2. 2nd Mirror
3. 1st Mirror
4. Exposure Lamp
5. Ventilation Fan Motor
6. Ozone Filter
7. Lens
8. Main Erase Lamp
9. Cleaning Blade
10. PC Drum Charge Corona
11. PC Drum
12. 6th Mirror
13. Image Erase Lamp
14. 4th Mirror
15. 5th Mirror
16. Sub Hopper
17. Transport Roller
18. Manual Bypass Take-Up Roll
19. Upper Vertical Transport Roller
20. Lower Vertical Transport Roller
21. 2nd Drawer Paper Take-Up Roll
22. 1st Drawer Paper Take-Up Roll
23. Synchronizing Roller
24. Image Transfer/Paper Separator Coronas
25. Main Drive Motor
26. Suction Belt
27. Fusing Roller
28. 1st Paper Exit Roller
29. 2nd Paper Exit Roller
30. Exit/Duplex Switching Guide

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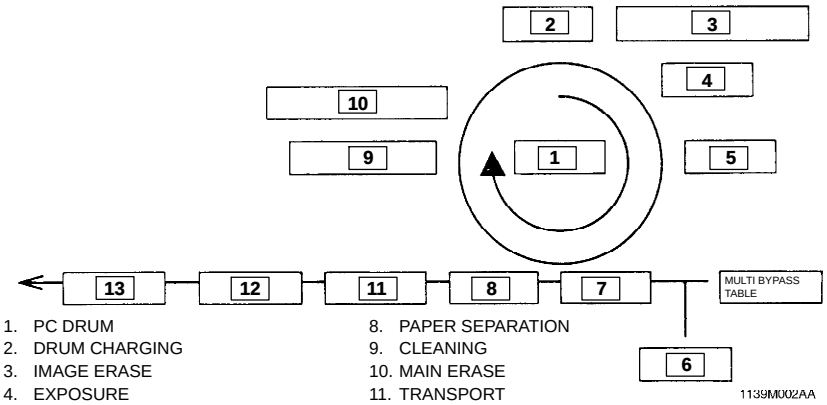
2 COPY PROCESS



1. PC DRUM
2. DRUM CHARGING
3. IMAGE ERASE
4. EXPOSURE
5. DEVELOPING
6. PAPER FEEDING
7. IMAGE TRANSFER
8. PAPER SEPARATION
9. CLEANING
10. MAIN ERASE
11. TRANSPORT
12. FUSING
13. PAPER EXIT

1. PC Drum

The PC Drum is an aluminum cylinder coated with a photosensitive semiconductor. It is used as the medium on which a visible developed image of the original is formed.

(For more details, see “8. PC DRUM”.)

2. Drum Charging

The PC Drum Charge Corona Unit is equipped with a Comb Electrode and a Scorotron Grid to deposit a uniform negative charge across the entire surface of the PC Drum.

(For more details, see “9. DRUM CHARGING”.)

3. Image Erase

Any areas of charge which are not to be developed are neutralized by lighting up LEDs.

(For more details, see “10. IMAGE ERASE LAMP”.)

4. Exposure

Light from the Exposure Lamp reflected off the original is guided to the surface of the PC Drum and reduces the level of the negative charges, thereby forming an electrostatic latent image.

(For more details, see “11. OPTICAL SECTION”.)

5. Developing

Toner positively charged in the Developer Mixing Chamber is attracted onto the electrostatic latent image changing it to a visible, developed image. A DC negative bias voltage is applied to the Sleeve/Magnet Roller to prevent toner from being attracted onto those areas of the PC Drum which correspond to the background areas of the original.

(For more details, see “13. DEVELOPMENT”.)

6. Paper Feeding
Paper is fed either automatically from the 1st or 2nd Drawer, or manually via the Multi Bypass Table or Manual Bypass Table. Paper separation is accomplished by the torque limiter fitted to the Paper Separator Roll.

(For more details, see “18. PAPER TAKE-UP/FEED SECTION”.)

7. Image Transfer
The single-wire Image Transfer Corona Unit applies a DC negative corona emission to the underside of the paper, thereby attracting toner onto the surface of the paper.

(For more details, see “14. IMAGE TRANSFER AND PAPER SEPARATION”.)

8. Paper Separation
The single-wire Paper Separator Corona Unit applies an AC corona emission to the underside of the paper to neutralize the paper. In addition, mechanical paper separation is provided by the two PC Drum Paper Separator Fingers fitted to the Imaging Unit.

(For more details, see “14. IMAGE TRANSFER AND PAPER SEPARATION”.)

9. Cleaning
Residual toner on the surface of the PC Drum is scraped off by the Cleaning Blade.

(For more details, see “16. CLEANING UNIT”.)

10. Main Erase
Light from the Main Erase Lamp neutralizes any surface potential remaining on the surface of the PC Drum after cleaning.

(For more details, see “17. MAIN ERASE LAMP”.)

11. Transport
The paper is fed to the Fusing Unit by the Suction Belts.

(For more details, see “22. PAPER TRANSPORT”.)

12. Fusing
The developed image is permanently fused to the paper by a combination of heat and pressure applied by the Upper and Lower Fusing Rollers.

(For more details, see “23. FUSING UNIT”.)

13. Paper Exit
After the fusing process the paper is fed out by the Paper Exit Roller onto the Copy Tray.

(For more details, see “24. EXIT UNIT”.)

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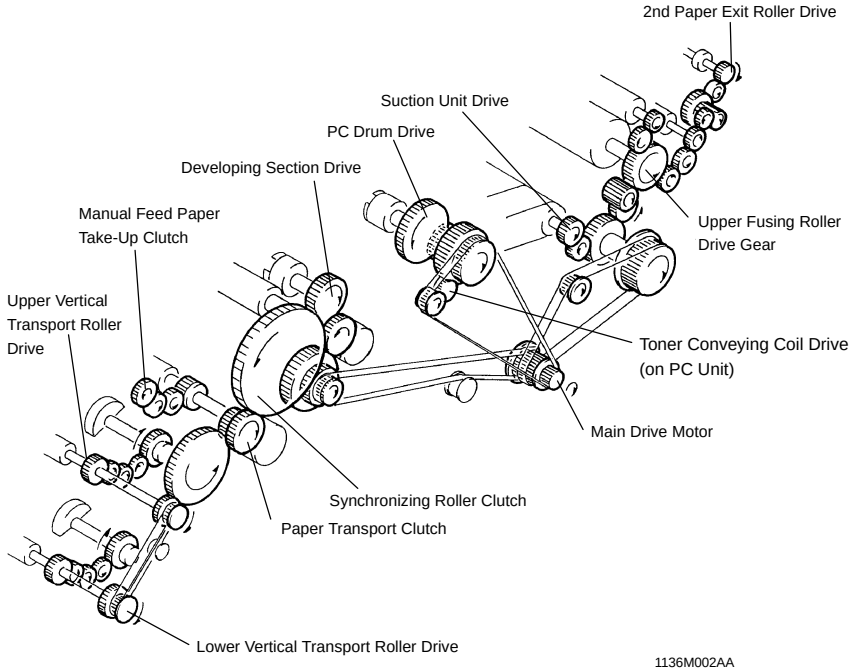
3 DRIVE SYSTEM

The Main Drive Motor provides drive for the entire mechanism of the copier. To help minimize operating noise, timing belts and plastic gears are used in large numbers for the drive train parts.



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4 SEQUENTIAL EXPLANATION

* Figure in ( ) are the timer values for EP5000.

A **The power cord is plugged into the outlet.**

- ON → DC Power Supply Unit PU1 outputs DC24V for dehumidifying heating.
- ON → Drum Dehumidifying Heater H3
- ON → Paper Dehumidifying Heater H2

Only when Drum Dehumidifying Switch S3 and Paper Dehumidifying Switch S12 are ON

B **Power Switch S1 is turned ON.**

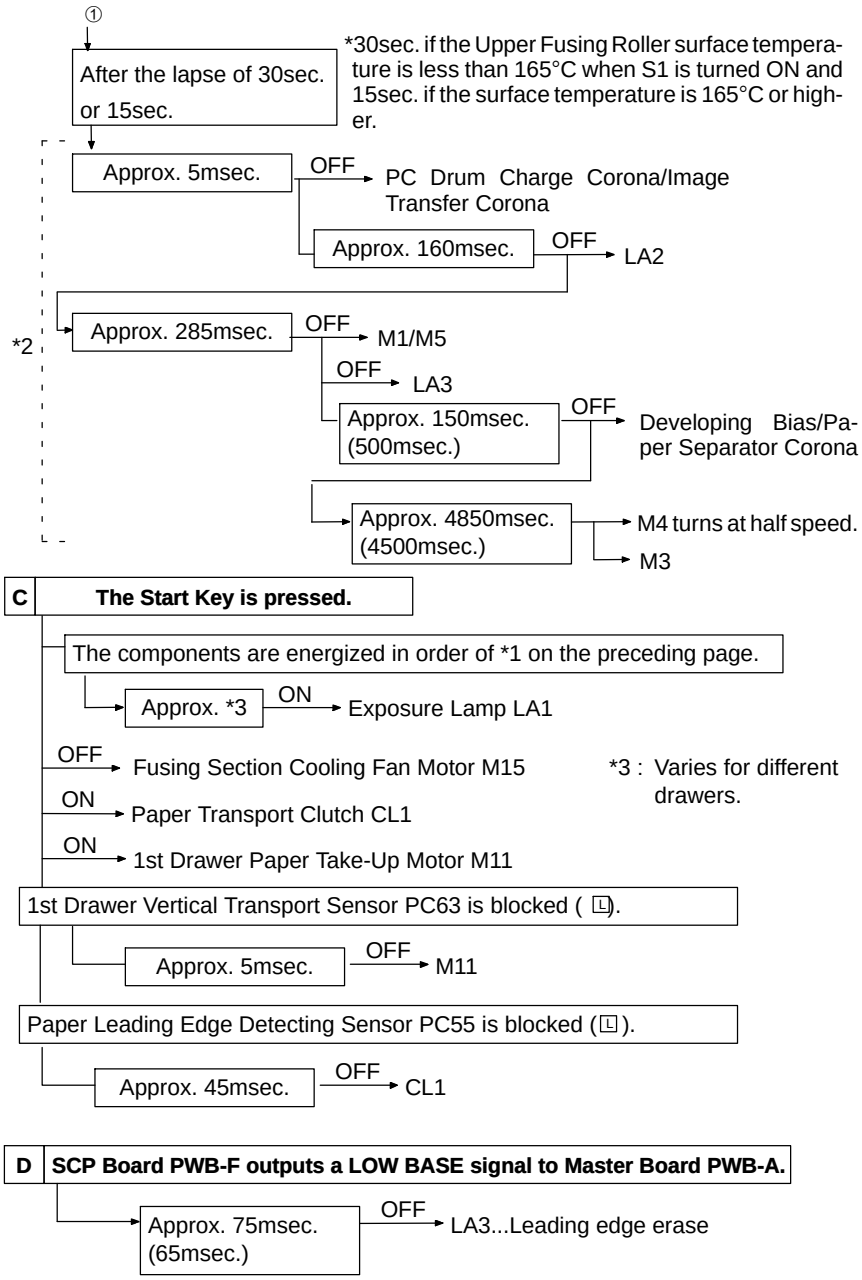
- OFF → H2
- ON → PU1 outputs DC24V and DC 5V.
  - ON → Power Supply Board PWB-C outputs DC 24V. (DC24V line: ON)
  - ON → Master Board PWB-A outputs DC4.7V and DC12V.
- ON → Control panel display
- ON → Suction Fan Motor M4 turns at half speed.
- ON → Fusing Section Cooling Fan Motor M15
- Approx. 1sec. → ON → Fusing Heater Lamp H1
- The Lens is detected at the home position.
- The Mirror is detected at the home position.
- The Scanner makes its initial motion.
  - The Lens is detected at the full size position.
  - The Mirror is detected at the full size position.

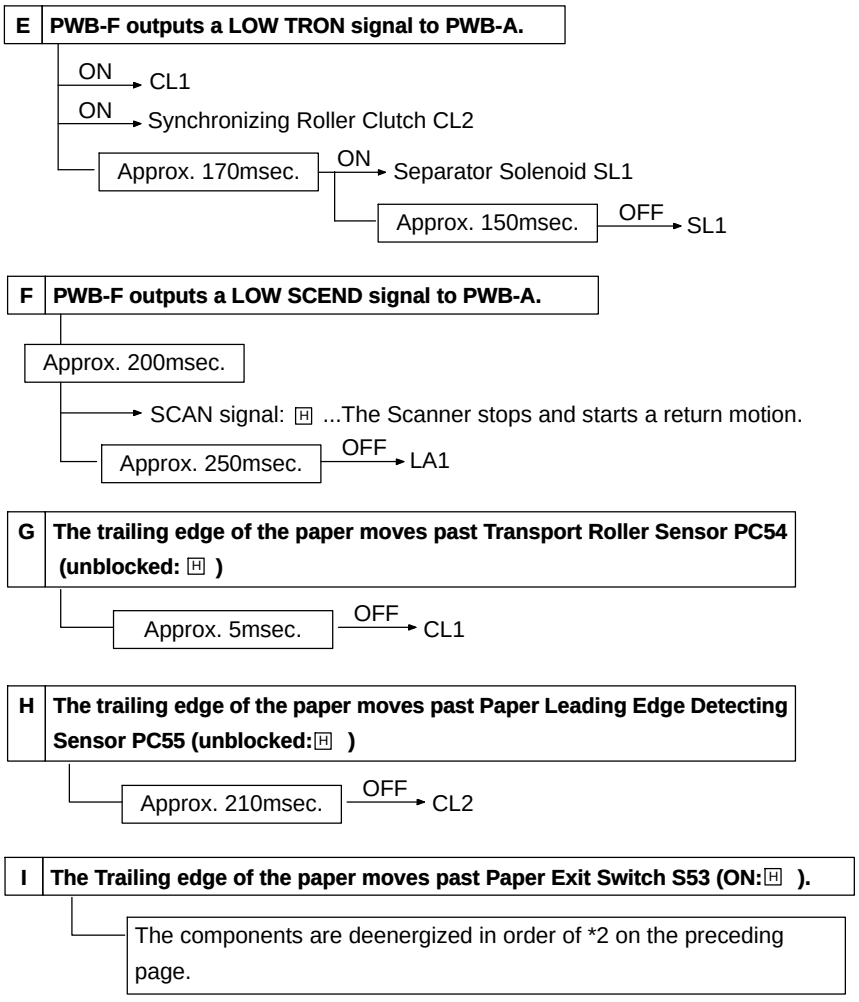
The surface temperature of the Upper Fusing Roller reaches 165°C.

*1

- ON → Main Drive Motor M1 and Original Glass Cooling Fan Motor M5 start predrive.
- ON → Ventilation Fan Motor M3
- ON → M4 turns at full speed.
- ON → Developing Bias/Paper Separator Corona
- Approx. 100msec. → ON → Image Erase Lamp LA2
  - Approx. 200msec. → ON → PC Drum Charge Corona/ Image Transfer Corona
  - ON → Main Erase Lamp LA3

To ① on next page


①
After the lapse of 30sec.
or 15sec.
*30sec. if the Upper Fusing Roller surface temperature is less than 165°C when S1 is turned ON and 15sec. if the surface temperature is 165°C or higher.
Approx. 5msec.
OFF
PC Drum Charge Corona/Image Transfer Corona
Approx. 160msec.
OFF
LA2
*2
Approx. 285msec.
OFF
M1/M5
OFF
LA3
Approx. 150msec. (500msec.)
OFF
Developing Bias/Paper Separator Corona
Approx. 4850msec. (4500msec.)
M4 turns at half speed.
M3
C
The Start Key is pressed.
The components are energized in order of *1 on the preceding page.
Approx. *3
ON
Exposure Lamp LA1
OFF
Fusing Section Cooling Fan Motor M15
*3 : Varies for different drawers.
ON
Paper Transport Clutch CL1
ON
1st Drawer Paper Take-Up Motor M11
1st Drawer Vertical Transport Sensor PC63 is blocked (L).
Approx. 5msec.
OFF
M11
Paper Leading Edge Detecting Sensor PC55 is blocked (L).
Approx. 45msec.
OFF
CL1
D
SCP Board PWB-F outputs a LOW BASE signal to Master Board PWB-A.
Approx. 75msec. (65msec.)
OFF
LA3...Leading edge erase


E
PWB-F outputs a LOW TRON signal to PWB-A.
ON
CL1
ON
Synchronizing Roller Clutch CL2
Approx. 170msec.
ON
Separator Solenoid SL1
Approx. 150msec.
OFF
SL1
F
PWB-F outputs a LOW SCEND signal to PWB-A.
Approx. 200msec.
SCAN signal: H ...The Scanner stops and starts a return motion.
Approx. 250msec.
OFF
LA1
G
The trailing edge of the paper moves past Transport Roller Sensor PC54 (unblocked: H)
Approx. 5msec.
OFF
CL1
H
The trailing edge of the paper moves past Paper Leading Edge Detecting Sensor PC55 (unblocked:H)
Approx. 210msec.
OFF
CL2
I
The Trailing edge of the paper moves past Paper Exit Switch S53 (ON:H).
The components are deenergized in order of *2 on the preceding page.

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5 WATCHDOG (CPU OVERRUN MONITOR) FUNCTION

The watchdog function monitors whether any of the CPUs mounted in the copier overrun. If this function detects that a CPU overruns, the copier automatically resets the CPU, thereby restarting the logic circuit and mechanism.

Even if a copier CPU operates erratically due to electrical noise, therefore, the copier is able to recover from the faulty condition so that the number of visits made by the Technical Representative for CPU overrun can be minimized.

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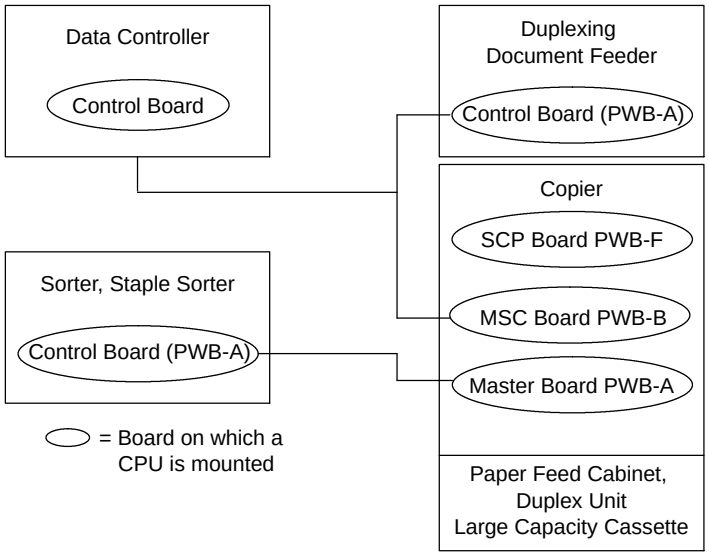
5-1. Configuration

The copier has three printed-circuit boards each on which a CPU is mounted:
*SCP Board PWB-F that controls the optical system,
*Master Board PWB-A that controls the copier, Paper Feed Cabinet and Duplex Unit, and
*MSC Board PWB-B that controls the control panel and system.
In addition to these, each of the control boards for the Data Controller, Duplexing Document Feeder, and Sorter/Staple Sorter is equipped with a CPU.

The watchdog functions are summarized as follows:
*Each of the copier CPUs monitors whether or not it overruns.
*The MSC CPU monitors the communications conditions of the CPUs in the Duplexing Document Feeder and Data Controller.
*The Master CPU monitors the communications conditions of the CPUs in the Sorter and Staple Sorter.
*The control boards for the Paper Feed Cabinet and Duplex Unit do not have a CPU in them. Instead, the Master CPU in the copier controls their operations.



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5-2. Watchdog Function Post-Processing

The following processing is performed if a faulty condition is detected in the CPU.
When the copier CPU is found faulty:

- **D** All CPUs including those of the options are reset and the system is restarted. If the CPU is found faulty during a copy cycle, the system attempts to feed all sheets of paper out of the copier before resetting. (If paper is left inside the copier, the copier detects it as a misfeed as it is restarted.)

When an option CPU is found faulty:

- **D** The option relays are turned OFF and ON and all options are then restarted. If the CPU is found faulty during a copy cycle, the copier stops the paper take-up sequence and feeds all sheets of paper out of the copier before resetting.

The Watchdog Counter available from the Tech. Rep. mode allows the Technical Representative to check if any faulty condition has occurred in the CPU. For details, see SWITCHES ON PWBs.

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6 MALFUNCTION BYPASS FUNCTION

D When a malfunction occurs in the copier, the malfunction bypass function permits the copier to continue operating if that malfunction is one of the predefined candidates for an isolated malfunction and if it will not affect the current copying operation. But, if an isolated malfunction occurs anytime during the actual copy cycle, the copier considers it a normal malfunction.

D If a copying function involving an isolated malfunction is selected, the message "Selected mode can't be used." appears on the Touch Panel and the copier rejects that function.

D When an isolated malfunction occurs, a tiny wrench " " indicator appears in the lower left corner of the Basic Screen. Access the "Machine Status" display by touching the wrench icon or via the Tech. Rep. mode to ascertain the trouble code. Then refer to the Troubleshooting Manual for details.

D Trouble codes for up to five isolated malfunctions are shown on the "Machine Status" display. When a sixth isolated malfunction occurs, the copier considers it a normal malfunction, prompting a Tech. Rep. call. (The sixth malfunction is shown on the Touch Panel.) But, if all of the paper feed ports (except the manual feed port) show an isolated malfunction, the copier considers them a normal malfunction even though the isolated malfunction count may be less than five. The display also tells the condition when the image stabilization controls are not properly working.

D For the details of the Isolated malfunction codes, see TROUBLESHOOTING for the copier and the specific SERVICE MANUAL for the options.

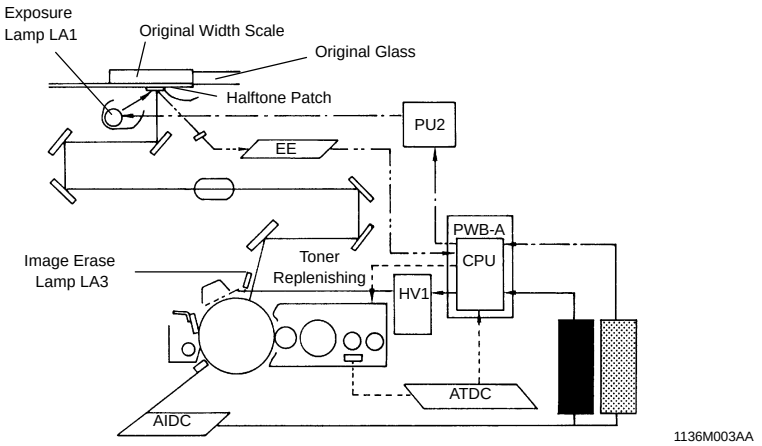
1149SBM0700A

7 IMAGE STABILIZATION SYSTEM

z The following image stabilization controls are provided to ensure stabilized copy image.

Item	Quality	Purpose	Control
Initial Setting	Image density, gradation	To make initial settings of grid voltage (Vg), optimum Exposure Lamp voltage, and AE Sensor gain.	Sets the initial values for grid voltage correction, optimum Exposure Lamp voltage correction, and AE Sensor gain adjustment.
Regular correction	Image density	To compensate for any drop in image density due to a deteriorating PC Drum.	Corrects the grid voltage through AIDC Sensor control.
	Gradation	To compensate for any drop in the intensity of LA1 light due to a contaminated optical system.	Corrects the optimum Exposure Lamp voltage through AIDC control.
	Foggy background	To keep a given toner-to-carrier ratio of the developer in the Developer Mixing Chamber.	Provides toner replenishing control by means of the ATDC Sensor. (For details, see 13. DEVELOPMENT.)
Correction made immediately after Power Switch is turned ON	Image density, gradation	To compensate for any drop in PC Drum surface potential when the copier is cool immediately after the Power switch is turned ON.	Corrects the grid voltage and optimum Exposure Lamp voltage through AIDC Sensor control.
Correction for Faulty AIDC Sensor	Image density, gradation	To compensate for image density and gradation aggravated by a faulty AIDC Sensor.	Corrects the grid voltage and optimum Exposure Lamp voltage according to the time through which the PC Drum has turned and the copier has run.

z The following is the block diagram of the image stabilization system.



1136M003AA

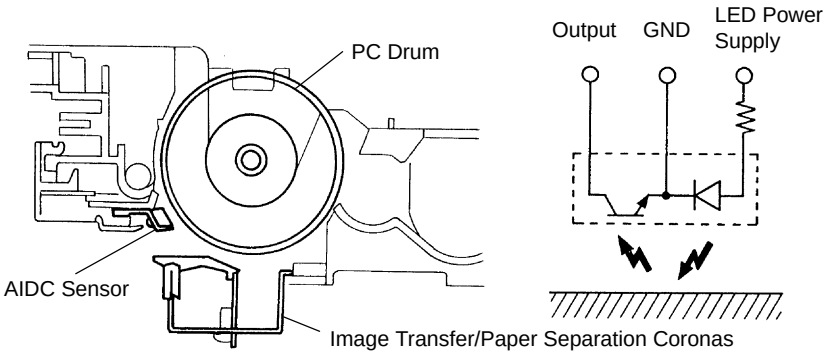
1149SBM0701A

7-1. AIDC Sensor

To provide image stabilization control, this copier has AIDC Sensor PWB-G fitted to the Cleaning Unit of the Imaging Unit. The sensor is used to detect the toner density and background level on the PC Drum.

Operation

1: The PWB-G LED projects approx. 950-nm infrared light onto the surface of the PC Drum.
2: The PWB-G phototransistor detects the amount of light reflected back.
3: The phototransistor outputs a voltage corresponding to the intensity of the light reflected back.



1149M005AA

Toner Density on PC Drum	Light reflected	Output Voltage
High	Small	High
Low	Large	Low

1156SBM0702A

7-2. Image Stabilization Control Processing Timing

D The image stabilization controls use the AIDC Sensor and AE Sensor as the basis, performing the following four major types of processing.
The grid voltage, T/C, and optimum Exposure Lamp corrections are not, however, made if T/C falls outside the range of 4% to 8% at adjustment.

① AIDC Sensor adjustment
② Grid voltage and T/C correction
③ Optimum Exposure Lamp voltage correction
④ AE Sensor gain adjustment

D Processing Timing

Item	Timing	Processing (f : Performed; □ : Not performed)			
	Processing Order ( )	①	②	③	④
Initial setting	At the initial setup, or when the FF or F5 test operation is run after the PC Drum has been replaced.	f	f (*1)	f	f
Regular correction	Upon completion of the copy cycle for every 400 copies made in terms of the number of intermittent copies, as it is equivalent to the time over which the PC Drum turns.	f	f	f	f
Correction immediately after S1 is turned ON	During warming-up immediately after the Power Switch has been turned ON (*3)	f	f	f	f
Correction for a faulty AIDC Sensor	Upon completion of the copy cycle for every 75K copies made in terms of the number of intermittent copies, as it is equivalent to the time over which the PC Drum has turned after a faulty AIDC Sensor was detected.	□	f (*2)	f (*2)	f

*1: T/C is not corrected when an F5 test operation is run.
*2: The grid voltage is increased by 30V and the optimum Exposure Lamp voltage by 1V. No T/C correction is made even when the grid voltage reaches its upper limit.
*3: The correction sequence is canceled as regular correction starts.

1156SBM0703A

7-3. Details of Image Stabilization Controls

① AIDC Sensor adjustment
② Grid voltage and T/C correction
③ Optimum Exposure Lamp voltage correction
④ AE Sensor gain adjustment

D The following is the details of each image stabilization control.

①-1 AIDC Sensor coarse adjustment
This adjustment represents a coarse adjustment of the AIDC Sensor when the ordinary control of only the LED current cannot cover part-to-part variations in the AIDC Sensor (installation, circuit, deterioration, etc.). The surface of the PC Drum whose charges have been neutralized is exposed to light from the LED. The output current from the AIDC Sensor goes through the load resistance selected by a 4-bit analog switch and the 4-bit analog switch selects the load resistance so that the resultant voltage becomes 1V or less.

①-2 AIDC Sensor fine adjustment
If the AIDC Sensor is dirty with toner, it results in an error being produced in the sensor output voltage value, providing a false reference value. The surface of the PC Drum which has been erased is exposed to light from the LED. The LED current value is varied through pulse width control so that the output voltage from the AIDC Sensor becomes 1V.

Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
AIDC Sensor	PJ11A-7A	Pulse output		1-I

② Grid voltage and T/C correction
The Image Erase Lamp produces a solid-black pattern on the surface of the PC Drum and the AIDC Sensor reads the pattern. The grid voltage is then varied so that the output from the AIDC Sensor remains at a given level or higher, which ensures that the toner-to-carrier ratio on the surface of the PC Drum becomes constant.
If an even greater solid-black density is required when the upper control limit of the grid voltage has already been reached, the target control value of T/C is raised in 0.5% steps up to 7%, thus terminating the adjustment sequence.

	Control Value	1 Step	Initial Value
Grid Voltage	550 to 790V	30V	550V

<Relation with Image Density>
The “Image Exposure” function of “Tech. Rep. Choice” available from the Tech. Rep. mode enables fine-adjustments of the grid voltage (solid-black image density) to be made. It specifies how many volts the optimum grid voltage determined by the image stabilization control is to be increased or decreased. This fine-adjustment value remains the same even when the optimum grid voltage is later varied by the image stabilization control.

Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
Grid voltage output from High Voltage Unit HV1	PJ13A-1	Pulse Output		3-F

③ Optimum Exposure Lamp voltage correction
The Exposure Lamp is turned ON to illuminate the halftone patch on the back of the Original Width Scale, thereby producing a halftone pattern on the surface of the PC Drum. The Exposure Lamp voltage is then varied so that the output from the AIDC Sensor falls within the target range, thereby ensuring an optimum exposure level.

	Control Value	1 Step	Initial Value
Exposure Lamp voltage (100V Areas)	40 to 80V	1V	58V
Exposure Lamp voltage (200V Areas)	80 to 160V	2V	116V

<Relation with “Manual Exposure Level” of F5>
The “manual exposure level” of Function F5 available from the Tech. Rep. mode enables fine-adjustments of the Exposure Lamp voltage (halftone image density) to be made. It specifies how many volts the optimum Exposure Lamp voltage determined by the image stabilization control is to be increased or decreased. This fine-adjustment value remains the same even when the optimum Exposure Lamp voltage is later varied by the image stabilization control.

Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
Exposure Lamp Regulator (PWB-J) REM	PJ8A-12	Pulse output		45-H

④ AE Sensor gain adjustment
The Exposure Lamp is turned ON to illuminate the blank sheet of paper placed on the Original Glass (when an F5 or FF operation is run) or the halftone patch on the back of the Original Width Scale (when the AE Sensor gain is adjusted in a sequence other than F5 or FF). The reflected light is then read by the AE Sensor and a gain adjustment of the AE Sensor is made to maintain an optimum Auto exposure level.

Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
AE Sensor Board PWB-H	PJ3A-2	Pulse Output		12-B

1149SBM0800A

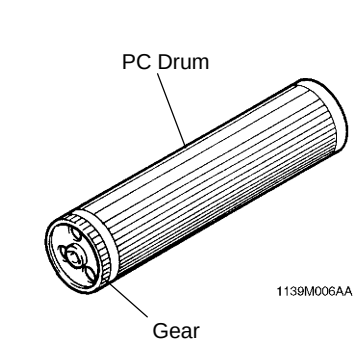
8 PC DRUM

The photoconductive drum used in this copier is the organic photoconductor (OPC) type. The drum is made up of two distinct, semiconductive materials on an aluminum alloy base. The outer of the two layers is called the Charge Transport Layer (CTL), while the inner layer is called the Charge Generating Layer (CGL).

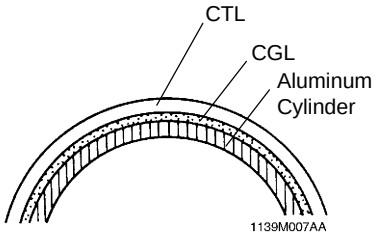
The PC Drum has its grounding point inside at the rear end. When the Imaging Unit is installed in the copier, the shaft on which the PC Drum Drive Coupling Gear is mounted contacts this grounding point.

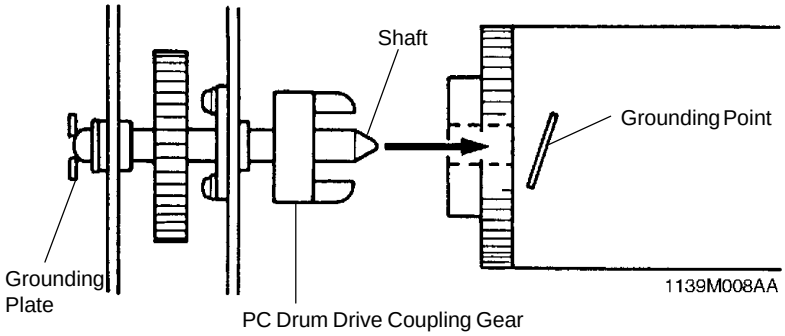
Handling Precautions

This photoconductor exhibits greatest light fatigue after being exposed to light over an extended period of time. It must therefore be protected from light by a clean, soft cloth whenever the Imaging Unit has been removed from the copier. Further, use utmost care when handling the PC Drum to prevent it from being contaminated.



PC Drum Cross-Sectional View





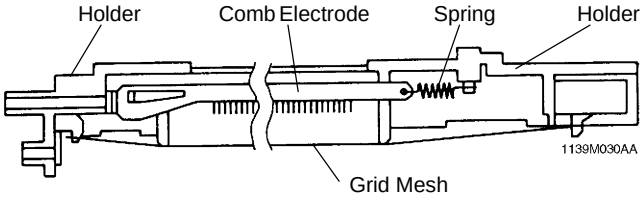
1156SBM0900A

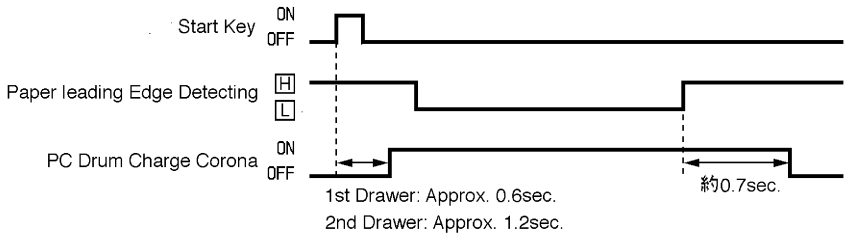
9 DRUM CHARGING

The PC Drum Charge Corona has a Scorotron grid to deposit a negative DC charge evenly across the surface of the PC Drum. The grid voltage (VG) applied to the grid mesh is selected between 550V (initial value, variable according to image stabilization controls) in the normal mode and the value in the normal mode +90V in the Photo mode by the Constant-Voltage Circuit in High Voltage Unit HV1.

The Corona Unit has a Comb Electrode which minimizes the amount of ozone produced. The conventional wire type corona unit produces a large amount of ozone due to corona discharge in radial directions. The comb electrode type, on the other hand, discharges only toward the Grid Mesh, meaning a reduced amount of ozone is produced.

The Comb Electrode can be cleaned by the user who pulls out to the front the shaft on which a Cleaning Rollar is mounted.





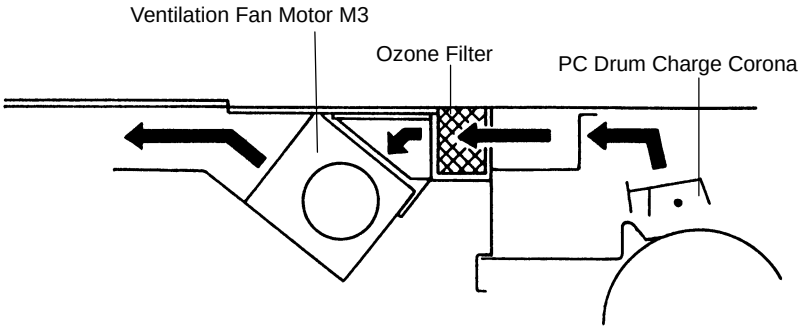
	Control Signal	ON	OFF	WIRING DIAGRAM
PC Drum Charge Corona	PWB-A PJ13A-2	L	H	3-F

	Control Signal	Normal Mode	Photo Mode	WIRING DIAGRAM
Grid Voltage (VG)	PWB-A PJ13A-1	Pulse output		3-F

1156SBM0901A

9-1. Ozone Filter

D Ozone produced by the PC Drum Charge Corona is absorbed by the Ozone Filter located to the left of the PC Drum Charge Corona, as the air is drawn out of the copier by Ventilation Fan Motor M3.



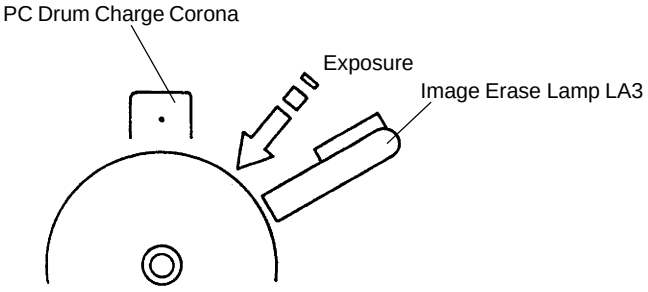
1134M004AA

	Control Signal	ON	OFF	WIRING DIAGRAM
M3	PJ34A-1	H	L	11-F

1156SBM1000A

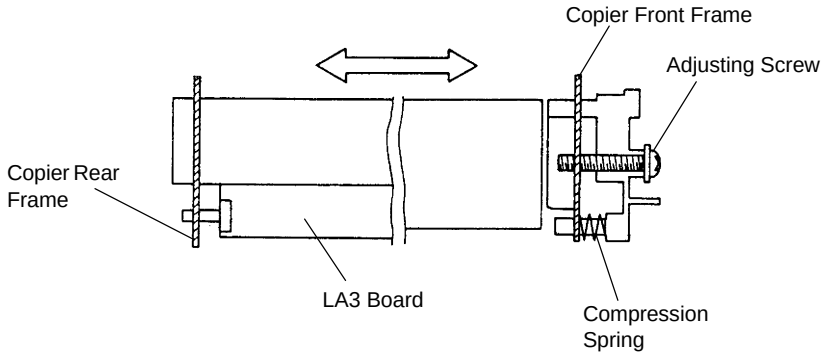
10 IMAGE ERASE LAMP

To prevent a black band from occurring across both the leading and trailing edges, and along the front and rear edges, of the electrostatic latent image, 40 LEDs of Image Erase Lamp LA3 are turned ON before development takes place, thereby reducing to a minimum the unnecessary potential on the surface of the PC Drum.



1156M010AA

The position of LA3 can be adjusted using the adjusting screw at the front of the copier.



1156M011AA

The 40 LEDs are grouped as follows and turned ON and OFF according to the paper size and zoom ratio.

* In the full size mode, ON/OFF control is provided according to the paper size.
* In any zoom ratio other than full size, the copier compares the number of LEDs that are turned ON according to the paper size with the number that are turned ON according to the zoom ratio and uses the one that turns ON more LEDs.
*The zoom ratio is used to provide ON/OFF control of the LEDs if paper size is not input in manual bypass copying, since the copier is unable to detect the paper size.

LED Group No.	LED No.	LED Group No.	LED No.
0	LED1	16	LED 17
1	LED 2	17	LED 18
2	LED 3	18	LED 19
3	LED 4	19	LED 20
4	LED 5	20	LED 21
5	LED 6	21	LED 22
6	LED 7	22	LED 23
7	LED 8	23	LED 24
8	LED 9	24	LED 25
9	LED 10	25	LED 26
10	LED 11	26	LED 27 to 35
11	LED 12	27	LED 36
12	LED 13	28	LED 37
13	LED 14	29	LED 38
14	LED 15	30	LED 39
15	LED 16	31	LED 40

*The bigger the number, the nearer the LED is to the front side of the copier.

LA2 LEDs ON/OFF Pattern

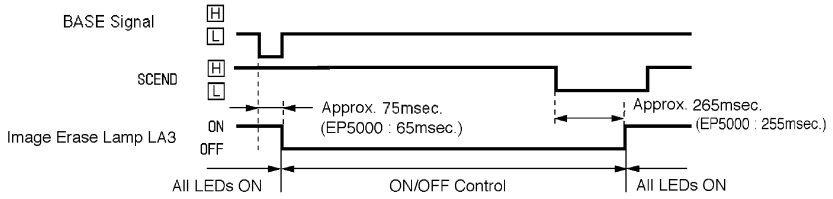
Zoom Ratio	Paper Width (mm)	LED Group No.																														
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	31
	91	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f				f
	92 99	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f					f
	100 107	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f						f
	108 116	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f							f
	117 126	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f								f
	127 135	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f									f
	136 142	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f										f
0.522	143 149	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f											f
0.523 0.550	150 158	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f												f
0.551 0.576	159 166	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f													f
0.577 0.610	167 173	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f														f
0.611 0.642	174 184	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f															f
0.643 0.672	185 195	f	f	f	f	f	f	f	f	f	f	f	f	f	f																f
0.673 0.698	196 203	f	f	f	f	f	f	f	f	f	f	f	f	f																	f
0.699 0.728	204 211	f	f	f	f	f	f	f	f	f	f	f	f																		f
0.729 0.758	212 220	f	f	f	f	f	f	f	f	f	f	f																			f
0.759 0.776	221 229	f	f	f	f	f	f	f	f	f	f																				f
0.777 0.806	230 235	f	f	f	f	f	f	f	f	f																					f
0.807 0.830	236 244	f	f	f	f	f	f	f	f																						f
0.831 0.854	245 251	f	f	f	f	f	f	f																							f
0.855 0.882	252 258	f	f	f	f	f	f																								f
0.883 0.914	259 267	f	f	f	f	f																									f
0.915 0.938	268 277	f	f	f	f																										f
0.939 0.964	278 284	f	f	f																											f
0.965 0.990	285 292	f	f																												f
0.991	293 298	f																													f

f = LED that turns ON

LA2 LEDs ON/OFF Pattern (Frame Erase, erase width 10mm)

Paper Width (mm)	LED Group No.																															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	30	31
105	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f			f	f
106 113	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f				f	f
114 121	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f					f	f
122 130	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f						f	f
131 140	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f							f	f
141 149	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f								f	f
150 156	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f									f	f
157 164	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f										f	f
165 172	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f											f	f
173 180	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f												f	f
181 188	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f													f	f
189 198	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f														f	f
199 208	f	f	f	f	f	f	f	f	f	f	f	f	f	f															f	f
209 217	f	f	f	f	f	f	f	f	f	f	f	f	f																f	f
218 225	f	f	f	f	f	f	f	f	f	f	f	f																	f	f
226 234	f	f	f	f	f	f	f	f	f	f	f																		f	f
235 243	f	f	f	f	f	f	f	f	f	f																			f	f
244 249	f	f	f	f	f	f	f	f	f																				f	f
250 258	f	f	f	f	f	f	f	f																					f	f
259 265	f	f	f	f	f	f	f																						f	f
266 272	f	f	f	f	f	f																							f	f
273 281	f	f	f	f	f																								f	f
282 291	f	f	f	f																									f	f
292 298	f	f	f																										f	f
299	f	f																											f	f

f = LED that turns ON



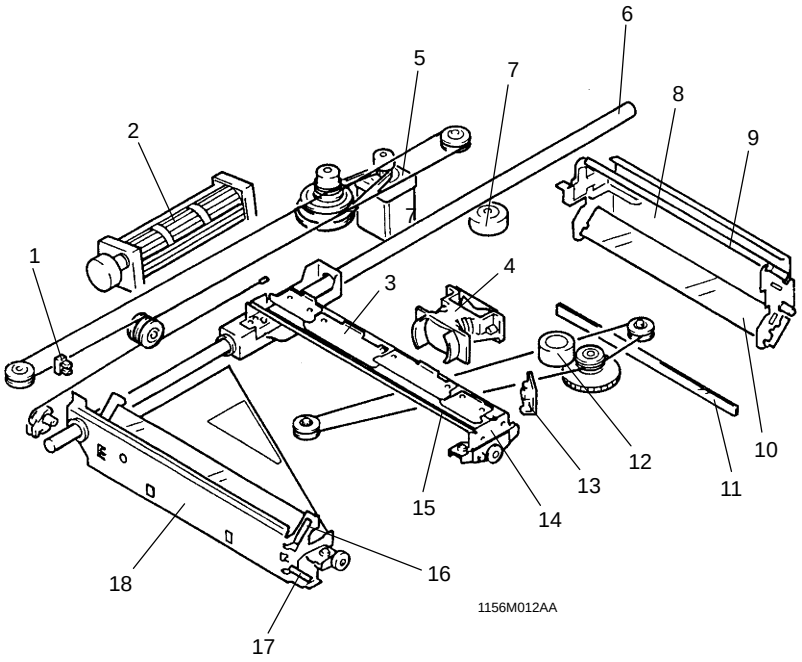
1151T20MCB

	Control Signal	ON	OFF	WIRING DIAGRAM
LA3	PWB-A PJ9A-1~6	Static ON/OFF Control		4-L

1156SBM1100A

11 OPTICAL SECTION

As the Scanner is moved by Scanner Motor M2, the light from Exposure Lamp LA1 is reflected off the original and guided through the six Mirrors onto the surface of the PC Drum to form the electrostatic latent image.



1. Scanner Reference Position Sensor PC81
2. Original Glass Cooling Fan Motor M5
3. Scanner
4. Lens
5. Scanner Motor M2
6. Scanner Shaft
7. Mirror Motor M7
8. 4th/5th Mirrors Carriage
9. 4th Mirror
10. 5th Mirror
11. 6th Mirror
12. Lens Motor M6
13. AE Sensor Board PWB-H
14. Exposure Lamp LA1
15. 1st Mirror
16. 2nd Mirror
17. 3rd Mirror
18. 2nd/3rd Mirrors Carriage

1156SBM1101A

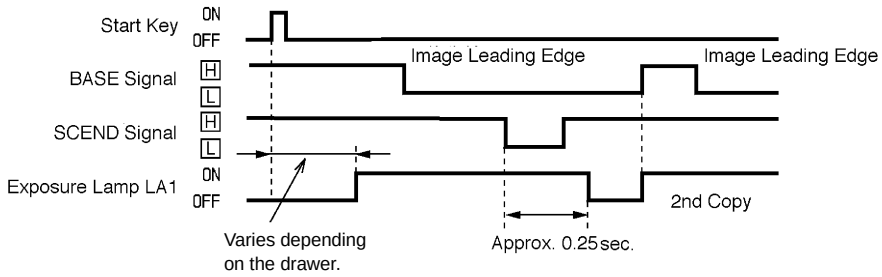
11-1. Exposure Lamp LA1

An AC halogen lamp is used as Exposure Lamp LA1.

As the exposure level is adjusted on the control panel, the duty ratio of the pulse of AVR Remote from PWB-A changes to increase or decrease the LA1 voltage, thereby changing the image density.

In Photo mode, the voltages are varied on a level 3V (200V Areas: 6V) lower than the manual Exposure Lamp voltages.

Manual EXP Setting			9	8	7	6	5	4	3	2	1
Lamp Voltage Difference (V)	"Manual Level Priority"	Mode 1	8	5	2	1	Reference	+1	+2	+5	+8
		Mode 2	8	6	4	2	Reference	+2	+4	+6	+8
		Mode 3	8	7	6	3	Reference	+3	+6	+7	+8



	Control Signal	ON	OFF	WIRING DIAGRAM
AVR Remote Signal (PWB-J)	PWB-A PJ8A-13	L	H	45-H

1156SBM1102A

11-2. AE Sensor

In the Auto Exposure Mode, the AE Sensor on AE Sensor Board PWB-H measures the intensity of the light reflected off the original, by sampling the black/white ratio of a 210-mm-wide area of the original being measured. According to this measurement, the Exposure Lamp voltage is automatically increased or decreased so that copies of consistent quality are produced.

The output from the AE Sensor is applied to PWB-A which, in turn, varies the duty ratio of the AVR Remote which varies the LA1 voltage accordingly.

Original Density (B/W Ratio)	High	Low
Intensity of Reflected Light	Low	High
PWB-H Output	High	Low
AVR Duty	Increased	Decreased
LA1 Voltage	Increased	Decreased

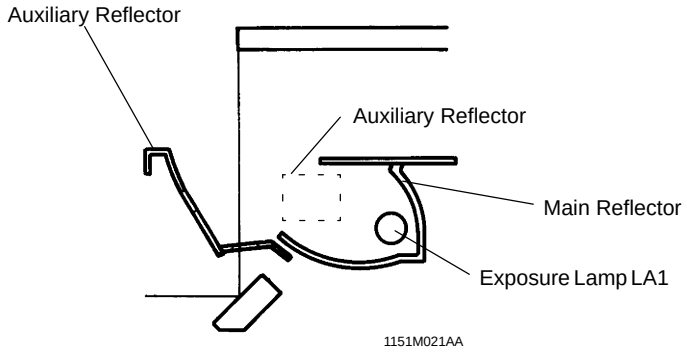
	Control Signal	**ON**	**OFF**	**WIRING DIAGRAM**
PWB-H (AE Sensor)	PWB-A PJ3A-2	Pulse output		12-B
AVR Remote Signal (PWB-J)	PWB-A PJ8A-13	L	H	45-H

1156SBM1103A

11-3. Lamp Reflectors

The Main Reflector ensures that light from Exposure Lamp LA1 exposes all areas of the original. The Auxiliary Reflector functions to reflect light onto the areas that LA1 cannot illuminate when an original that does not lie flat on the Original Glass (such as a book) is being used. This reduces shadows which would otherwise be transferred to the copy.

The Main Reflector is of aluminum, while the Auxiliary Reflector is aluminum to which film has been deposited. The same film as that used on the Auxiliary Reflector is affixed to both ends of the frame to compensate for the reduced intensity of light around both ends of the Exposure Lamp.



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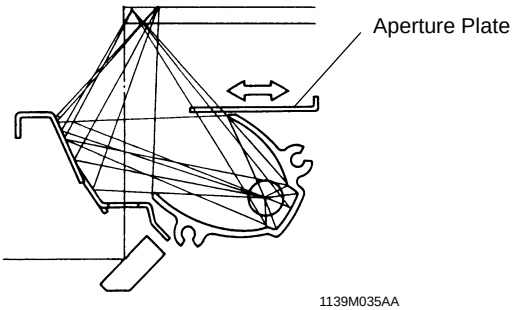
1156SBM1104A

11-4. Aperture Plates

Four Aperture Plates are moved to the front or rear to ensure even light distribution.



1139M035AA

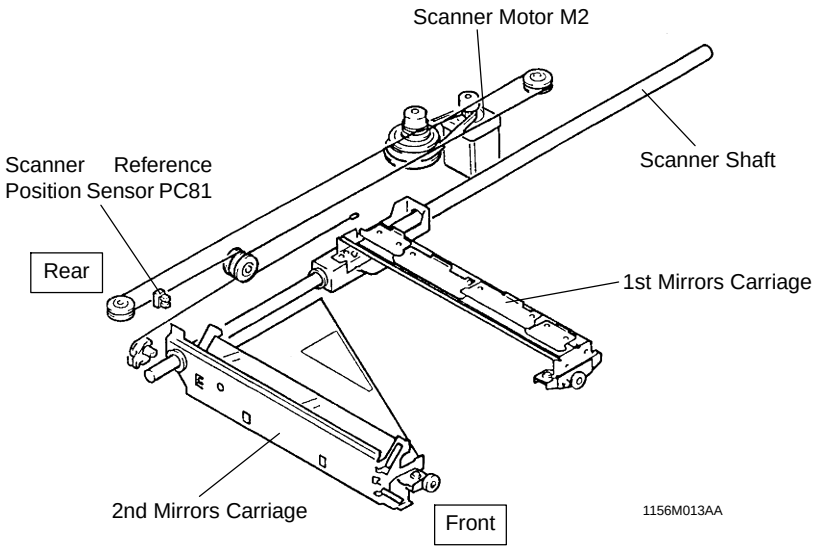
1156SBM1105A

11-5. Scanner and 2nd/3rd Mirror Carriage Movement

The Scanner and 2nd/3rd Mirrors Carriage are moved by the Scanner Drive Cable fitted in the rear side of the copier. The Cable is driven by Scanner Motor M2.

Both the Scanner and 2nd/3rd Mirrors Carriage slide along the Scanner Shaft at the rear side. While at the front side, there is a Slide Bushing attached to the underside of each of the bodies and that Bushing slides over the Slide Rail. The speed of the Scanner and 2nd/3rd Mirrors Carriage varies with different zoom ratios.

Scanner Reference Position Sensor PC81 detects the home position of the Scanner and 2nd/3rd Mirrors Carriage. If they are not at the home position when the copier is turned ON, M2 is energized to move them to the home position.



The Scanner starts the scan motion as a Scan signal is output from PWB-A. At the start of a scan motion and other heavy load conditions, Scanner Motor M2 requires a large amount of current. The Current 1 or 2 signal from PWB-F is selected accordingly to vary the amount of current supplied to M2.

*The Current signal selection timing is controlled by software.

	L	M1	M2
Current 1	H	L	H
Current 2	H	H	L
Current	M2>M1>L		
Operation	When the scan speed reaches a given level and during scan deceleration	At scan start and during return deceleration. (*)	At return start and during return motion. (*)

* M2 is used at scan start of a small zoom ratio.

On receiving the Scan signal, Motor Drive Board PWB-F applies motor drive pulses, which are out-of-phase with each other, to M4. The motor speed is varied by changing the width of the pulses applied to M2.

	Control Signal	**Energized**	**Deenergized**	**WIRING DIAGRAM**
M2 Scan Signal	PWB-F	L	H	22-B
M2 Current Switching Signal 1	PWB-F	L	H	
M2 Current Switching Signal 2	PWB-F	L	H	

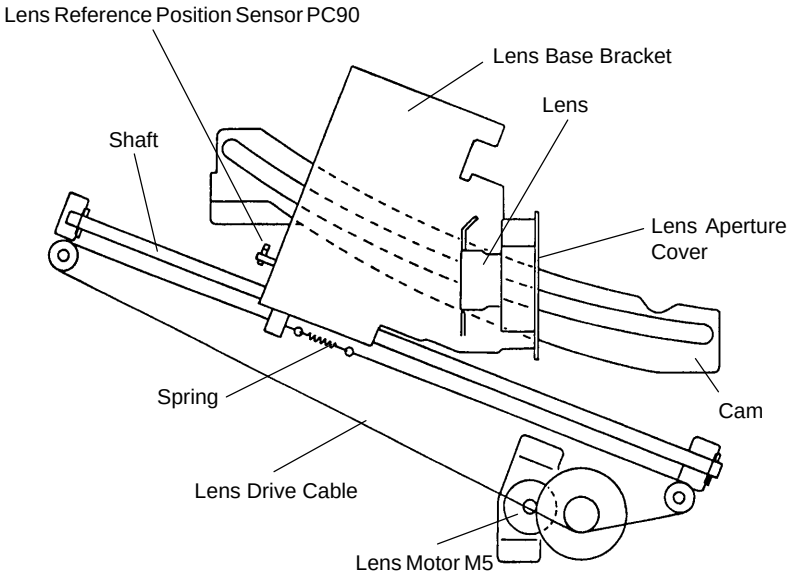
	Control Signal	**Blocked**	**Unblocked**	**WIRING DIAGRAM**
PC81	PWB-F	L	H	18-E

1156SBM1106A

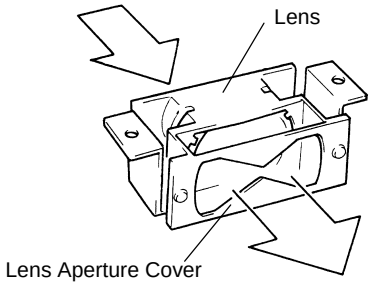
11-6. Lens Movement

The Lens is moved by the Lens Drive Cable which is driven by Lens Motor M6 (stepping motor). The motor drive pulses sent from PWB-F drive M5 to move the Lens a given distance, corresponding to the zoom ratio, from the reference position determined by Lens Reference Position Sensor PC90.

There is a fixed-type Lens Aperture Cover provided at the rear of the Lens (on the 4th Mirror end). It limits the amount of light striking the surface of the PC Drum.



1156M014AB



1136M013AA

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M6	PWB-F	L	H	19-A

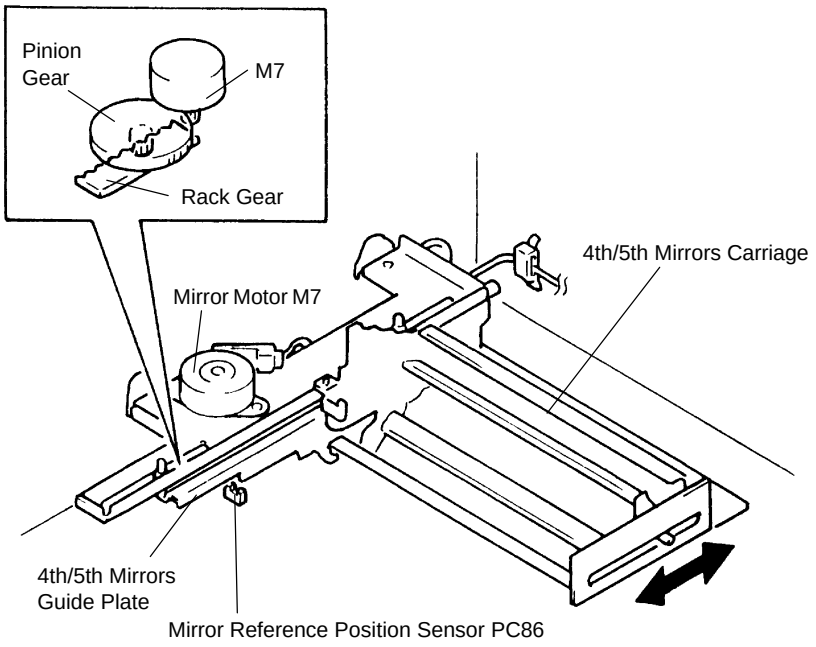
	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC90	PWB-F	L	H	18-D

1156SBM1107A

11-7. 4th/5th Mirrors Carriage Movement

The 4th/5th Mirrors Carriage is moved to vary the conjugate distance for a particular zoom ratio by driving the rack-and-pinion gears at the front and rear ends of the mirror using Mirror Motor M7 (stepping motor).

Mirror Reference Position Sensor PC86 is used to control the position of the 4th Mirror. It ensures that the Mirror is located at the home position when the copier is turned ON.



1136M017AA

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M7	PWB-F	L	H	19-B

	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC86	PWB-F	L	H	18-C

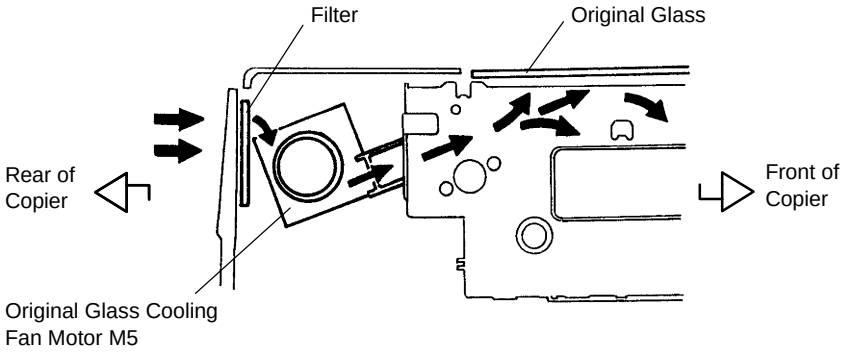
1156SBM1108A

11-8. Original Glass Cooling Fan

Optical Section Cooling Fan Motor M5 draws outside air into the copier and blows it against the Original Glass which is heated by lit Exposure Lamp LA1.

The Filter at the intake port of the Fan prevents dust and dirt from entering the Optical Section of the copier.

M5 turns only while Main Drive Motor M1 is being energized.



1149M024AA

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M5	PWB-A PJ15A-5	H	L	21-H

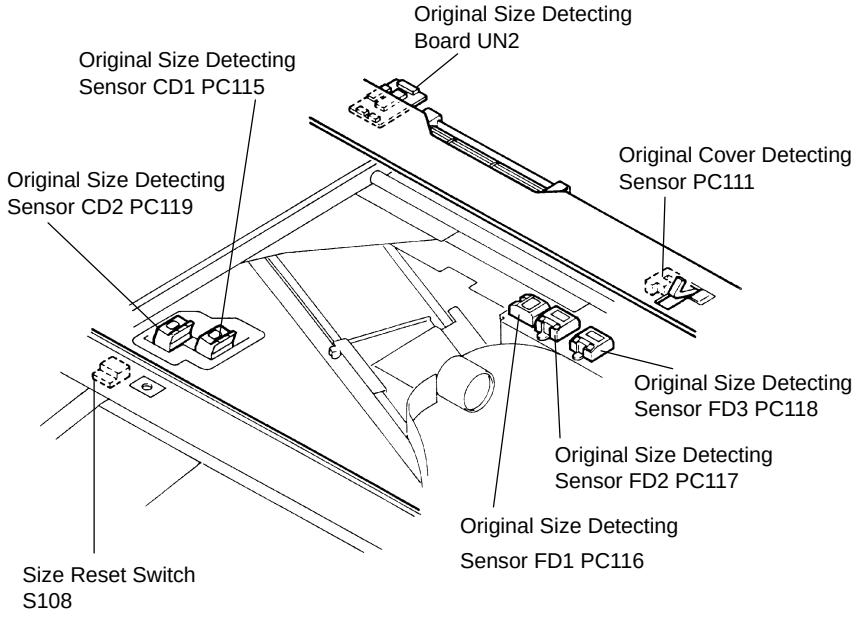
1156SBM1200A

12 ORIGINAL SIZE DETECTING SENSORS

The five sensors fixed in the optical section receive the light reflected off the original to determine the size of the original in the Auto Paper and Auto Size mode. (The image density of the original, or OD, that can be detected is 0.6 or less.)

1156SBM1201A

12-1. Identification of Original Size Detecting Sensors

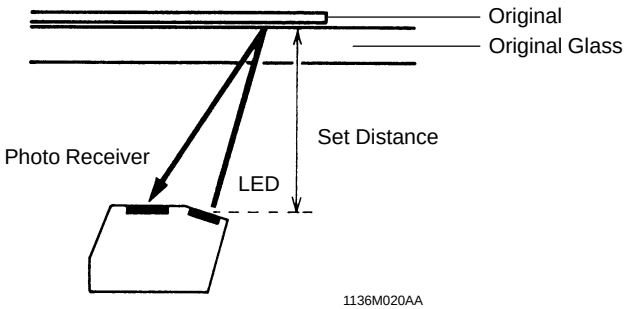


1136M018AA

1156SBM1202A

12-2. Original Size Detecting Operation

Each photo receiver of the original size detecting sensors (PC115 to 119) responds to reflected light of a given intensity with reference to the intensity of the light emitted by each LED. This allows the Original Size Detecting Board to determine whether or not there is an original within a set distance.



1136M020AA

1156SBM1203A

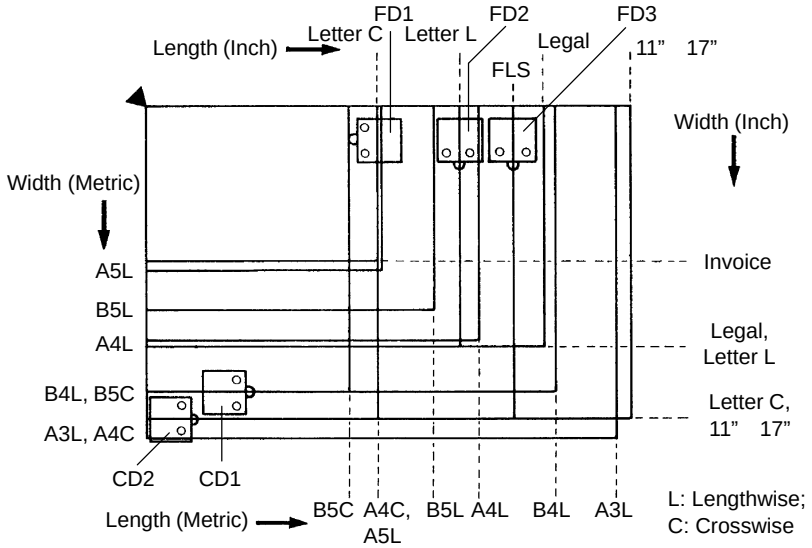
12-3. Sensor Locations

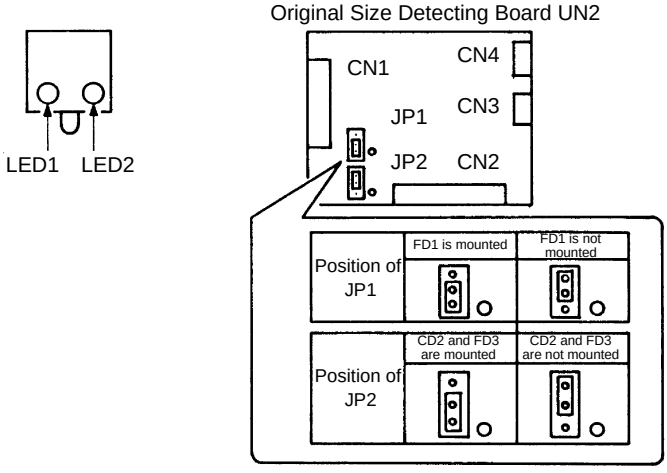
D The number and location of the Original Size Detecting Sensors vary depending on the marketing area as shown below.

f : Standard **F**: Optional

Areas \ Sensors	CD1 (PC115)	CD2 (PC119)	FD1 (PC116)	FD2 (PC117)	FD3 (PC118)
Metric Areas	**f**	**F**	**f**	**f**	**F**
Inch Areas	**f**	**F**	**F**	**f**	**F**
Hong Kong Area	**f**	**f**	**f**	**f**	**f**

NOTE: If the optional sensors are installed, set Jumper Connector JP2 on UN2 as illustrated below and run the F7 operation.





1136M022CA

1156SBM1204A

12-4. Size Detection

D Original Size Detecting Board UN2 reads the output data provided by the original size detecting sensors (PC115 to 119). By comparing the data from each sensor with the threshold level, it determines whether there is an original placed on the Original Glass. UN2 then determines the size of the original according to the combination of the data.

Metric Area

		FD1	FD2		FD3		CD1		CD2
Original Size	**Size Determined by UN2**	LED 2	LED 1	LED 2	LED 1	LED 2	LED 1	LED 2	LED 1
A3L	A3L (A3L)	**f**	**f**	**f**	**f** (**f**)	**f** (**F**)	**f**	**f**	**f** (**f**)
B4L	B4L (B4L)	**f**	**f**	**f**	**f** (**f**)	**f** (**F**)	**F**	**f**	**F** (**F**)
A4L	A4L (A4L)	**f**	**f**	**f**	**F** (**F**)	**F** (**F**)	**F**	**F**	**F** (**F**)
A5L	A5L (A5L)	**f**	**F**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**	**F** (**F**)
A4C	A4C (A4C)	**f**	**F**	**F**	**F** (**F**)	**F** (**F**)	**f**	**f**	**f** (**f**)
Letter L: 8-1/2" 11"	Letter L (Letter L)	**f**	**f**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**	**F** (**F**)
11" 17"	11" 17" (A3L)	**f**	**f**	**f**	**f** (**f**)	**f** (**F**)	**f**	**f**	**F** (**f**)
Legal: 8-1/2" 14"	Legal (A4L)	**f**	**f**	**f**	**f** (**F**)	**f** (**F**)	**F**	**F**	**F** (**F**)
FLS: 8-1/2" 13"	FLS (A4L)	**f**	**f**	**f**	**f** (**F**)	**F** (**F**)	**F**	**F**	**F** (**F**)
Letter C: 11" 8-1/2"	Letter C (A4C)	**f**	**F**	**F**	**F** (**F**)	**F** (**F**)	**f**	**f**	**F** (**f**)
No Original	No Original	**F**	**F**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**	**F** (**F**)

Inch Area

		FD1	FD2		FD3		CD1	
Original Size	**Size Determined by UN2**	LED2	LED1	LED2	LED1	LED2	LED1	LED2
11" 17"	11" 17" (11" 17")	**f** (**f**)	**f**	**f**	**f** (**f**)	**f** (**f**)	**f**	**f**
Legal: 8-1/2" 14"	Legal (Legal)	**f** (**f**)	**f**	**f**	**f** (**f**)	**f** (**f**)	**F**	**F**
Letter L: 8-1/2" 11"	Letter L (Letter L)	**f** (**f**)	**f**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**
Letter C: 11" 8-1/2"	Letter C (Letter C)	**f** (**f**)	**F**	**F**	**F** (**F**)	**F** (**F**)	**f**	**f**
FLS: 8-1/2" 13"	FLS (Legal)	**f** (**f**)	**f**	**f**	**f** (**f**)	**F** (**f**)	**F**	**F**
Invoice: 5-1/2" 8-1/2"	Invoice (No Original)	**f** (**F**)	**F**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**
No Original	No Original	**F** (**F**)	**F**	**F**	**F** (**F**)	**F** (**F**)	**F**	**F**

* **f** : Original Present **F** : Original Not Present

*If no optional sensors are mounted, data is processed as indicated in ( ) and the original sizes determined by UN2 are as indicated in ( ).

*UN2 does not use the data provided by LED1 of Original Size Detecting Sensor FD1 (PC116) and LED2 of CD2 (PC119) for the determination of the original size.

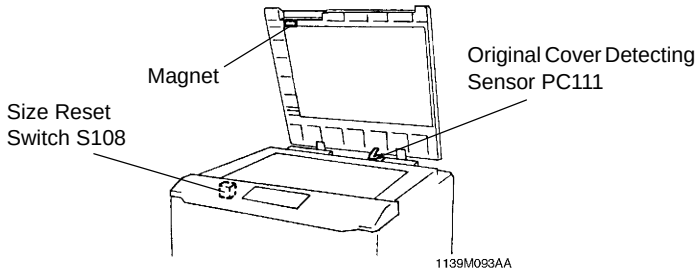
*Any non-standard size is rounded off to the nearest standard size.

1156SBM1205A

12-5. Original Size Detection Timing

Master CPU on PWB-A affirms and resets the readings of the original size at the following timings.

- **D** Takes size readings: When the Original Cover is raised to an angle of 15° or more (PC111 is deactivated).
- **D** Affirms size readings: When the Original Cover is lowered to an angle of 15° or less (PC111 is just activated); or, when the Start key is pressed with PC111 in the deactivated state.
- **D** Resets size readings: When the Original Cover is raised (S108 is deactuated).



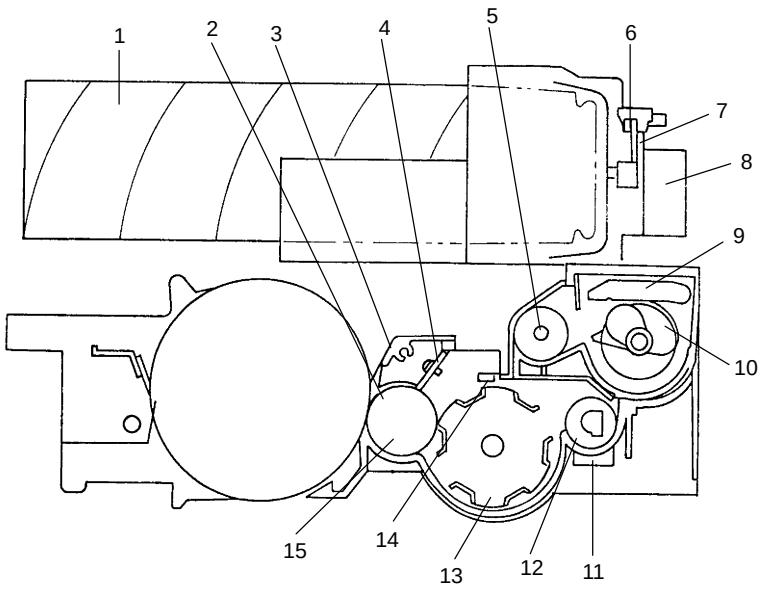
	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC111	PWB-A PJ17A-11	L	H	21-G

	Control Signal	ON	OFF	WIRING DIAGRAM
S108	PWB-A PJ12A-1	L	H	16-B

1156SBM1300A

13 DEVELOPING UNIT

D This copier employs the New Micro-Toning developing system. The toner fed up to the Sleeve/Magnet Roller is conveyed onto the points of development as the Sleeve/Magnet Roller turns, thereby forming a visible, developed toner image of the original.



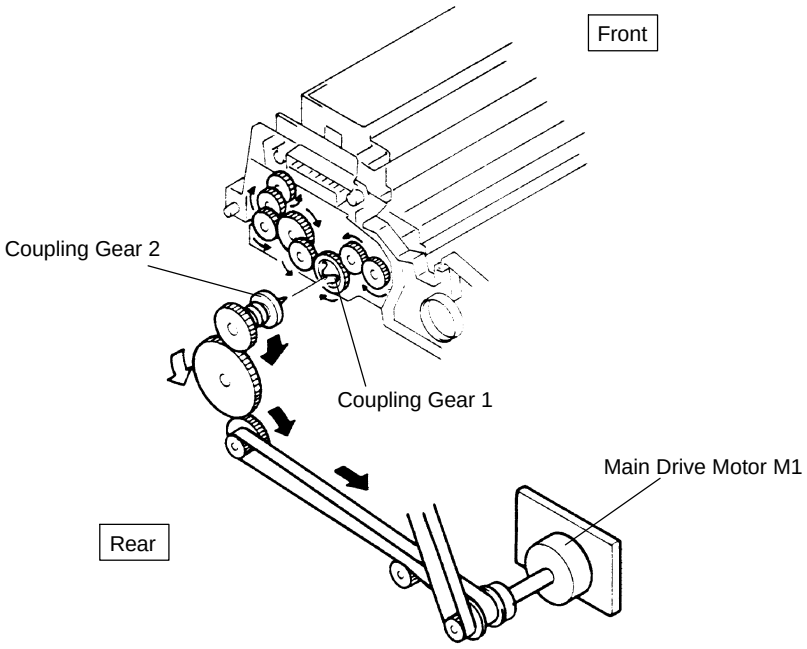
1156M015AA

1. Toner Bottle
2. Developer Scattering Prevention Mylar
3. Developer Scattering Prevention Plate
4. Doctor Blade
5. Sub Hopper Toner Supply Roller
6. Toner Bottle Home Position Sensor PC35
7. Toner Bottle Home Position Detecting Plate
8. Main Hopper Toner Replenishing Motor M8
9. Sub Hopper Toner Empty Detecting Lever
10. Sub Hopper Toner Agitating Lever
11. ATDC Sensor UN3
12. Developer Conveying/Agitating Screw
13. Bucket Roller
14. Magnet Sheet
15. Sleeve/Magnet Roller

1156SBM1301A

13-1. Developing Unit Drive Mechanism

- **D** Drive is transmitted from the copier to the Developing Unit by Coupling Gears 1 and 2 when they mesh.
- **D** Coupling Gear 2 is spring-loaded. If the protruding part of Coupling Gear 1 makes contact with that of Coupling Gear 2 when the Developing Unit is slid into the copier, spring-loaded Coupling Gear 2 is pushed back toward the rear of the copier allowing the Developing Unit to be slid into position. When drive is later transmitted to the Developing Unit, Coupling Gar 2 is pushed to the front by the tension of the spring to mesh positively with Coupling Gear 1.



1134M009AA

1156SBM1302A

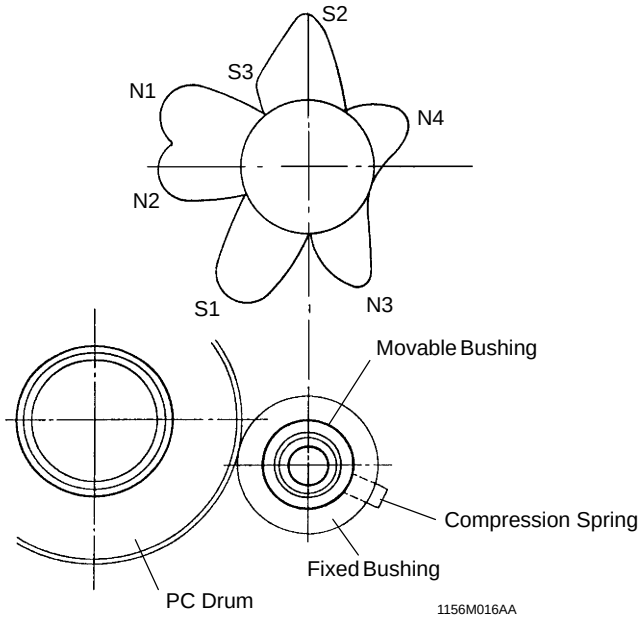
13-2. Magnet Roller

The Magnet Roller of the Sleeve/Magnet Roller of this copier has the following magnetic characteristics. Pole S3 before poles N1 and N2 at which development takes place provides a very weak magnetic force. If developer is compacted and clogs at the Doctor Blade and, as a result, part of the surface of the Sleeve/Magnet Roller is not covered with developer, the nearby developer around S3 goes to those uncovered areas because of the weak magnetic force. This helps prevent white lines from occuring on the copy.

The magnetic flux density is maximized to allow the bristle to stand high and upright at poles N1 and N2, at which development takes place. The positioning of these two like poles together helps agitate the developer for greater uniformity, thus preventing white lines from occurring on the copy.

The Sleeve Roller, onto which developer is attracted by the magnetic fields of force set up by the poles of the Magnet Roller, turns to convey the developer toward the point of development. This means that developer fresh from the Developer Mixing Chamber is always brought to the point of development.

The Imaging Unit integrates the Developing Unit with the PC Drum into one body. Because of that, it is impossible to move the Developing Unit against the PC Drum, thereby providing a certain distance between the PC Drum and Sleeve/Magnet Roller. The Magnet Roller has therefore been made movable: the Bushing is pressed by compression springs thereby pressing the Positioning Collars on both ends of the Magnet Roller against the PC Drum. This ensures a given distance between the PC Drum and the Sleeve/Magnet Roller.



1156SBM1303A

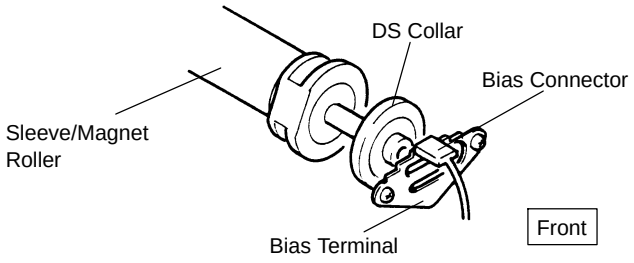
13-3. Developing Bias

A negative voltage (Vb = Developing Bias voltage) is applied to the Sleeve Roller to prevent a foggy background on the copy. The amount of toner attracted onto the surface of the PC Drum depends on how much lower the PC Drum surface potential (Vi) is than Vb (i.e., the potential difference).

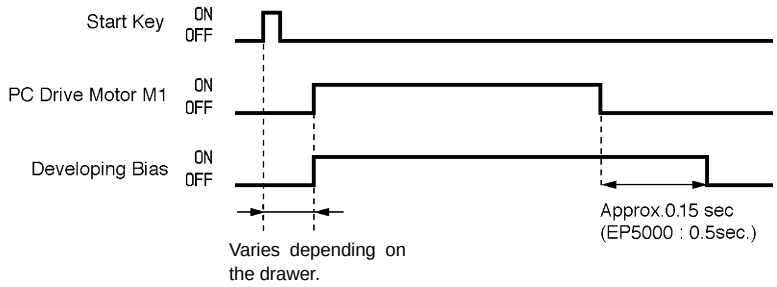
D When the potential difference is large, a greater amount of toner is attracted.

D When the potential difference is small, a smaller amount of toner is attracted.

Because the Magnet Roller of this copier is movable, a flat spring is used as the Bias Terminal which follows the movement of the Magnet Roller.



1134M018AA

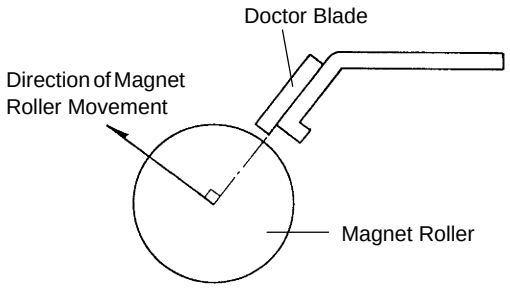


	Control Signal	ON	OFF	WIRING DIAGRAM
Developing Bias	PWB-A PJ13A-3	L	H	3-F

1156SBM1304A

13-4. Doctor Blade

The Doctor Blade installed over the Sleeve/Magnet Roller regulates the height of the developer brush on the surface of the Sleeve Roller. The Blade is perpendicular to the direction of movement of the Magnet Roller to minimize variations in the distance between the Doctor Blade and Magnet Roller as the Magnet Roller moves.



1156M017AA

13-5. ATDC Sensor

The copier compares the toner-to-carrier ratio (T/C) of the developer in the Developer Mixing Chamber detected by ATDC Sensor UN3 during a copy cycle with the reference ratio (6%) and, if it finds a lower ratio than the reference, replenishes the supply of toner. The standard output voltage of the ATDC Sensor for the reference T/C (6%) is 2.5V.

If the toner-to-carrier ratio becomes lower than 2.5% in a toner-empty condition, the copier inhibits the initiation of a new copy cycle (this feature can be enabled or disabled by a Tech. Rep. Choice mode). As soon as a ratio of 3% or more is recovered, the copier permits the initiation of a new copy cycle.

If the Front Door is swung open and closed with a T/C ratio of less than 3%, the copier initiates an Auxiliary Toner Replenishing sequence. (The toner-empty condition is canceled as soon as a T/C ratio of 3.5% is reached and the copier completes the Auxiliary Toner Replenishing sequence when the target level is reached.)

ATDC Sensor Automatic Adjustment

An automatic adjustment of the ATDC Sensor is made in the F8 or FF Test Mode operation.

***When F8 (or FF) is Run after Starter Has Been Changed:**

Following the execution of the starter setup mode, upon pressing the Start Key, the copier CPU reads the output value of the ATDC Sensor and adjusts the ATDC Sensor gain so that the output value becomes 2.5V.

NOTE: If an F8 (or FF) operation is run at a time when the starter has not been changed, it can result in a wrong T/C reference value being set by the copier. Avoid casual use of F8.

If the setting value has been cleared because of the RAM Board being replaced, use the "Level History" function of the Tech. Rep. mode to return the "ATDC Ref. Value" to the original value before the board was replaced.

Controlled Part	Control Signal	T/C Ratio	Standard Output Voltage	WIRING DIA-GRAM
UN3	PJ11A-2B	6.0(%)	2.5(V)	1-J

<Toner Replenishing Control by ATDC Sensor>

The ATDC Sensor samples T/C for each copy and the copier compares the reading with the reference T/C (which is normally 6% but may 7% depending on the image stabilization control provided), energizing Sub Hopper Toner Replenishing Motor M9 as may be necessary to replenish toner in either of the following four modes.

Toner Replenishing Mode	Conditions	Amount Replenished *
Large amount replenishing	The ATDC Sensor reading is lower than reference T/C by 0.5% or more.	Approx. 133 mg
Small amount replenishing	The ATDC Sensor reading is lower than reference T/C by less than 0.5%.	Approx. 66 mg
Fixed amount replenishing	The ATDC Sensor reading is higher than reference T/C by less than 1%.	Approx. 13mg
No toner replenishing	The ATDC Sensor reading is higher than reference T/C by 1% or more.	————

* The amount of toner replenished varies according to the paper size (given in the table are figures for A4). The copier is also provided with a function that, if T/C detected during a copy cycle is lower than the reference by 2% or more, interrupts the copy cycle and performs a toner replenishing sequence and, as soon as there is a gain of 1% against the T/C reading, resumes the copy cycle. This function is, however, disabled when a toner-empty condition is detected and the ATDC Sensor is found faulty.

<Toner Replenishing Control by AIDC Sensor>

This copier is equipped with a function that switches from the ATDC Sensor, if it becomes defective, to the AIDC Sensor to continue providing the toner replenishing control. A pattern is produced on the surface of the PC Drum for each copy between two successive copies or after it has been fed out. The AIDC Sensor reads that pattern to detect the amount of toner sticking to it and the copier performs either of the following toner replenishing sequences depending on the output voltage of the AIDC Sensor. (Controlled target T/C: 6%; AIDC Sensor output voltage: DC4.25V)

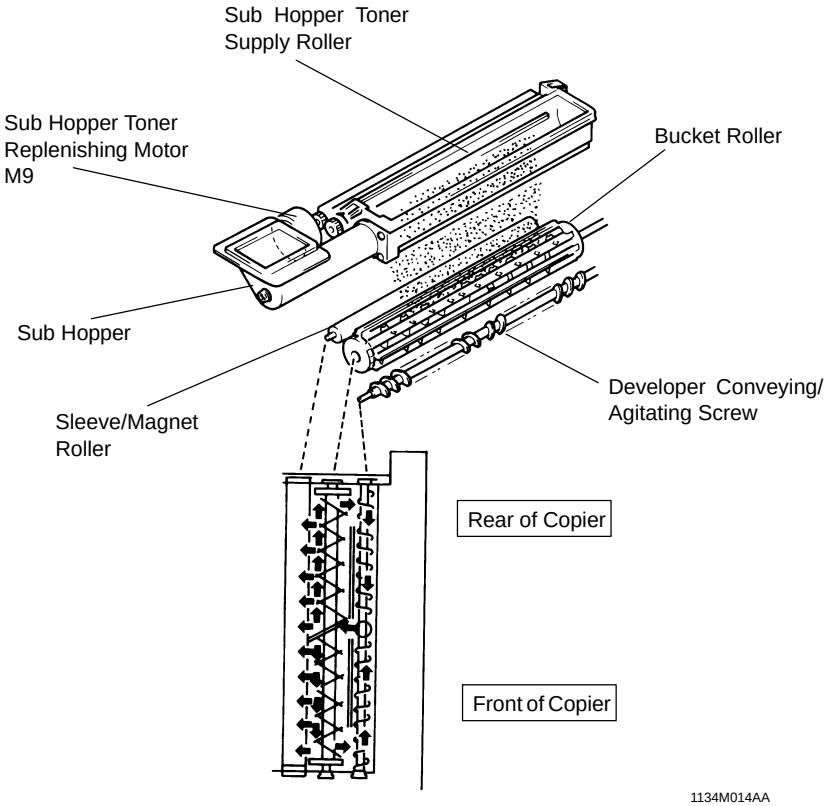
Toner Replenishing Mode	AIDC Sensor Output Voltage	Amount Replenished *
Large amount replenishing	Less than DC3.25V	Approx. 129 mg
Small amount replenishing	DC3.25V to less than 4.25V	Approx. 64 mg
Fixed amount replenishing	DC4.25V to less than 5.25V	Approx. 13 mg
No toner replenishing	DC5.25V or more	————

* The amount of toner replenished varies according to the paper size (given in the table are figures for A4).

1156SBM1306A

13-6. Sub Hopper Toner Replenishing Mechanism

Sub Hopper Toner Replenishing Motor M9 is energized for the toner replenishing time which is calculated based on the ATDC Sensor output voltage (T/C ratio) and the size of the paper being fed through the copier.

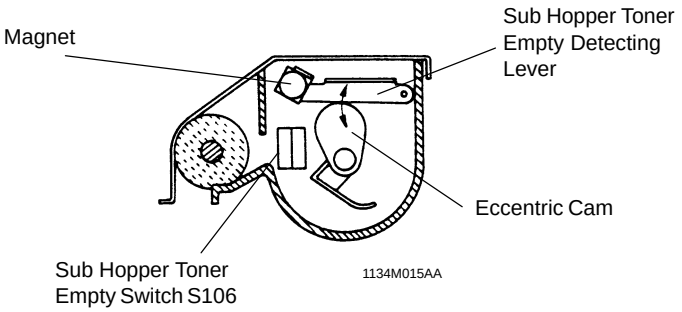


Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
M9	PJ11A-2A	L	H	2-H

1156SBM1307A

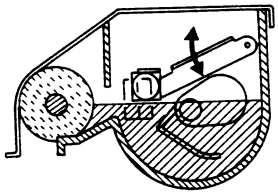
13-7. Sub Hopper Toner Empty Detection Control

- **D** A toner-empty condition in the Sub Hopper is detected by the magnet fitted to the Sub Hopper Toner Empty Detecting Lever and Sub Hopper Toner Empty Switch S106.
- **D** The Sub Hopper Toner Empty Detecting Lever rides on the eccentric cam fitted to the rear of the Sub Hopper Toner Agitating Lever. It is moved up and down as the eccentric cam is turned by the drive transmitted from Main Drive Motor M1.
- **D** While the amount of toner in the Sub Hopper is higher than the predetermined level, the Sub Hopper Toner Empty Detecting Lever rests on the toner and does not make the up-and -down motion. S106 therefore remains deactuated.
- **D** When the amount of toner in the Sub Hopper is lower than the predetermined level, the Sub Hopper Toner Empty Detecting Lever moves up and down by the eccentric cam. This result in S106 being actuated and deactuated. When the time S106 is actuated exceeds a predetermined value, the copier CPU determines that the Sub Hopper has run out of toner.



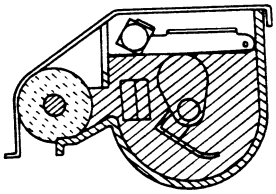
1134M015AA

Toner Empty



1134M016AA

Toner Full



1134M017AA

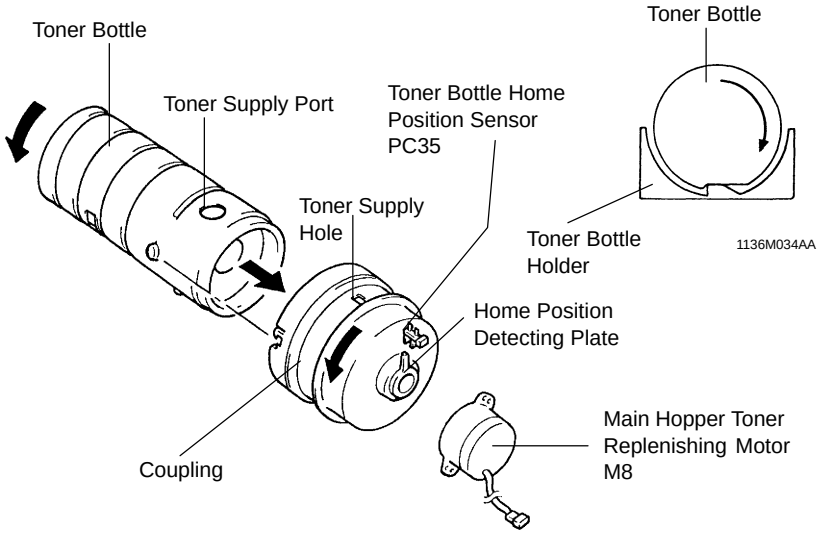
Controlled Part	Control Signal	ON	OFF	WIRING DIA-GRAM
Sub Hopper Toner Empty Switch S106	PJ11A-8B	L	H	2-L

1156SBM1308A

13-8. Main Hopper Toner Replenishing Mechanism

D Toner is supplied from the Main Hopper to Sub Hopper as follows. When a toner empty condition is detected in the Sub Hopper, it energizes Main Hopper Toner Replenishing Motor M8 to turn the Toner Bottle.

D The Home Position Detecting Plate fitted to the coupling and Toner Bottle Home Position Sensor PC35 ensure that the Toner Supply Port in the Toner Bottle is positioned at the top whenever the Toner Bottle is stopped.



1156M018AB

Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
M8	PJ11A-4A	L	H	2-H

Controlled Part	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC35	PJ11A-9B	L	H	2-K

1156SBM1309A

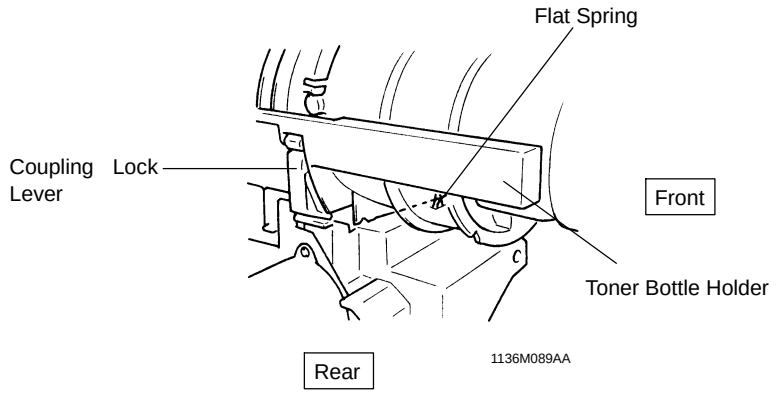
13-9. Swinging Out/In the Main Hopper

D To replace an empty Toner Bottle, the user first needs to swing the Toner Bottle Holder out 40° to the front. There is a flat spring installed on the Sub Hopper Holder, which causes the Toner Bottle Holder to click out of, and into, the locked position.

D The Holder pivots about the Toner Supply Port as it is swung out or in, which effectively prevents toner from spilling when the Holder is swung out or in. The Coupling is provided with a locking mechanism that prevents the Toner Bottle from turning when it is removed or installed.

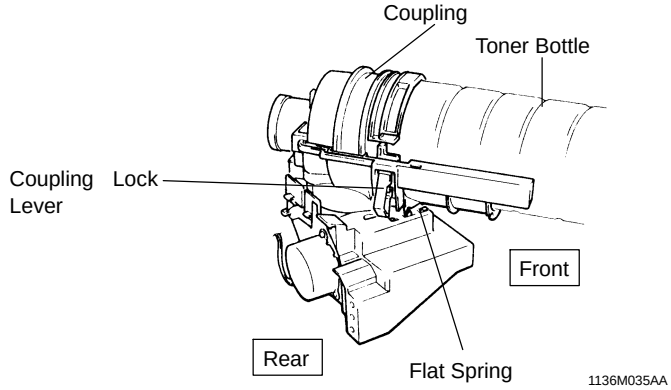
<When the Toner Bottle Holder is in Position>

D Since the flat spring fits into the front ^ notch of the Toner Bottle Holder, the Holder is locked in position. At this time, the bottom of the Coupling Lock Lever is pushed in by a part (*) of the Sub Hopper, keeping the Coupling free.



<When the Toner Bottle Holder is Swung Out>

D The Toner Bottle Holder pushes the flat spring down and moves over it until the flat spring then fits into the rear ^ notch. This locks the Toner Bottle Holder in position. At this time, the Coupling Lock Lever is free and the spring acts to lock the Coupling in position with the Lock Lever.



14 IMAGE TRANSFER AND PAPER SEPARATION

Image Transfer

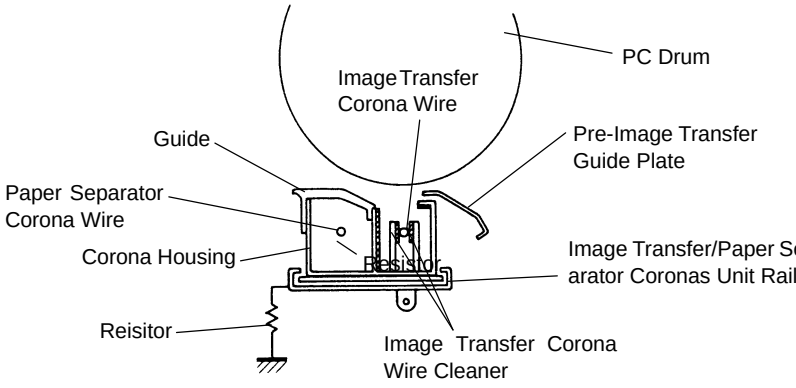
The Image Transfer Corona applies a DC negative corona emission to the underside of the paper thereby attracting the positively charged toner onto the surface of the paper to form a visible, developed image of the original. The Corona Unit is provided with a Corona Wire cleaning mechanism: the operator has only to pull out the Lever on which the Cleaner is mounted from the front of the copier, which cleans the Wire.

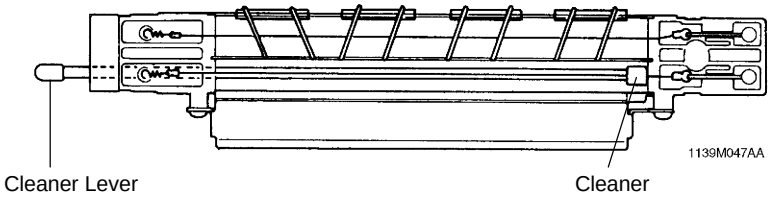
Paper Separation

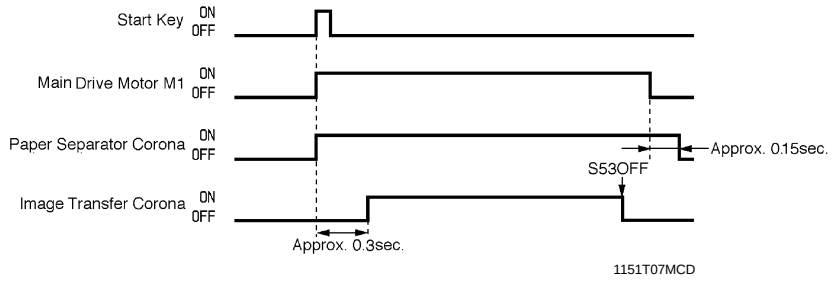
The Paper Separator Corona showers the underside of the paper with both positive and negative charges so that the paper can be easily separated from the PC Drum. In addition, two Paper Separator Fingers physically peel the paper off the surface of the PC Drum. (For details, see PAPER SEPARATOR FINGERS.)

The Image Transfer/Paper Separator Coronas Unit is provided with a Pre-Image Transfer Guide Plate that determines the angle at which the paper comes into contact with the PC Drum and keeps an optimum distance between the paper and the PC Drum so that the image may be properly transferred onto the paper.

The Image Transfer/Paper Separator Coronas Unit is grounded via a high capacity resistor, which improves its efficiency to discharge to the PC Drum side, thus reducing the output current from High Voltage Unit HV1.





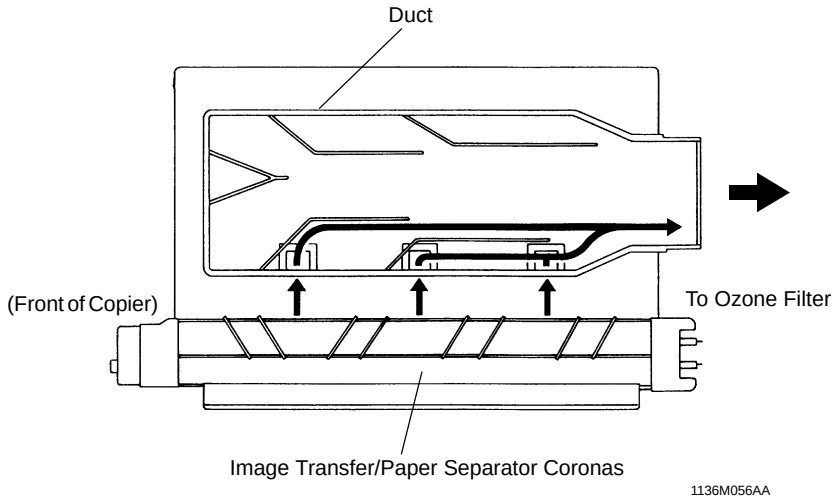


	Control Signal	ON	OFF	WIRING DIAGRAM
Image Transfer Corona	PWB-A PJ13A-2	L	H	3-F
Paper Separator Corona	PWB-A PJ13A-3	L	H	3-F

1156SBM1401A

14-1. Ozone Filter

Ozone produced by the Image Transfer/Paper Separator Coronas is absorbed by the Ozone Filter on the back of the copier. It is absorbed from the air being drawn out of the copier through the Duct under the Suction Deck by Suction Fan Motor M4.

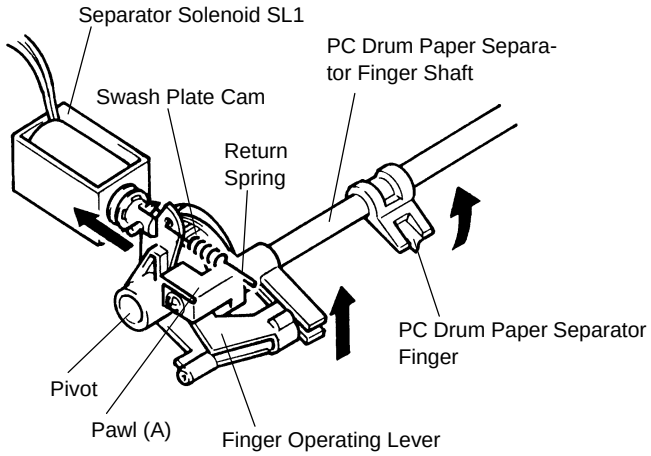


1156SBM1500A

15 PAPER SEPARATOR FINGERS

After image transfer, an AC corona emission is applied to the underside of the paper by the Paper Separator Corona to neutralize the paper so that it can be easily separated from the PC Drum. To further ensure that the paper is positively separated from the PC Drum, there are two Paper Separator Fingers attached to the Imaging Unit. They physically peel the paper off the surface of the PC Drum.

To prevent the Paper Separator Fingers from damaging the surface of the PC Drum, they are kept in the retracted position whenever they are not at work. As illustrated below, the Fingers are brought into contact with, and retracted from, the surface of the PC Drum by the Lever which is operated by Separator Solenoid SL1.



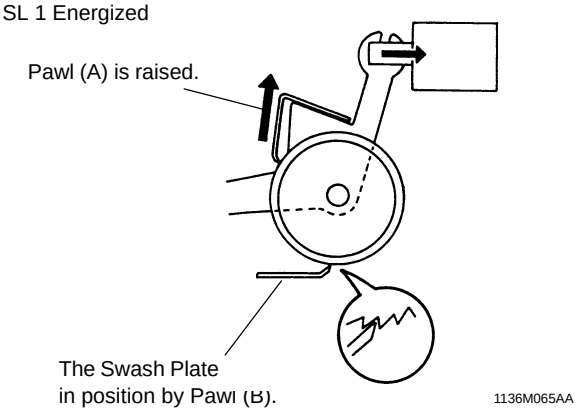
1136M064AA

<Paper Separator Finger Front-to-Back Moving Mechanism>

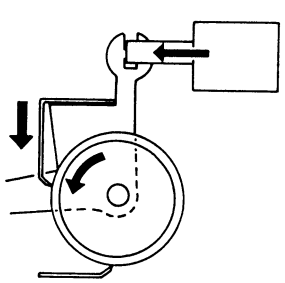
The Paper Separator Fingers are also moved over a given distance to the front and rear so that they will contact wider areas of the surface of the PC Drum, thus preventing localized damage to the PC Drum surface.

- **D** The Swash Cam mounted on the Pivot Pin of the Finger Operating Lever is moved through steps by means of the Ratchet wheel and SL1, causing the Swash Cam to push the Finger Shaft.
- **D** The lateral movement of the Paper Separator Fingers is 3.5 mm (which is equivalent to 60 times energization of SL1).

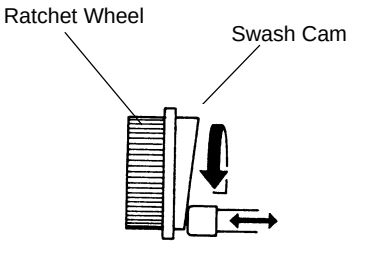
SL 1 Energized



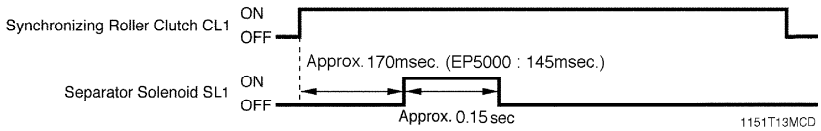
SL 1 Deenergized



Pawl (A) pushes the Swash Cam downward to turn it one notch.



Paper Separator Finger Shaft

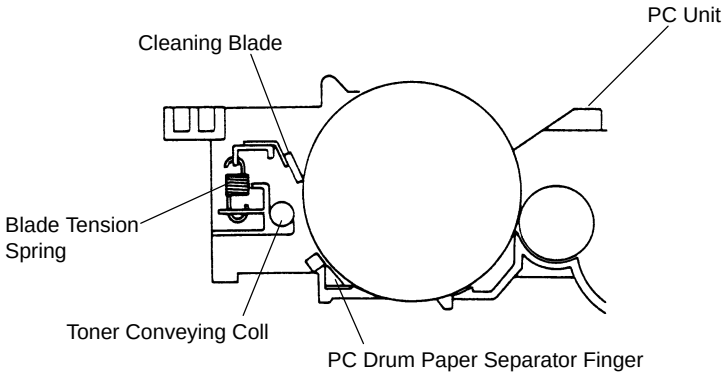


	Control Signal	Energized	Deenergized	WIRING DIAGRAM
SL1	PWB-A PJ11A-6A	L	H	2-I

1156SBM1600A

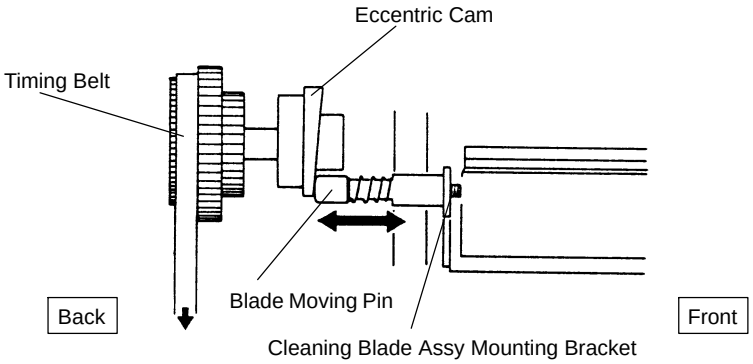
16 CLEANING UNIT

The Cleaning Blade is pressed tightly against the surface of the PC Drum and scrapes off any toner remaining on the surface after image transfer and paper separation have been completed.



1134M027AA

The Cleaning Blade is moved back and forth to prevent the PC Drum from deteriorating and the Cleaning Blade from warping away from the surface of the PC Drum.



1134M028AA

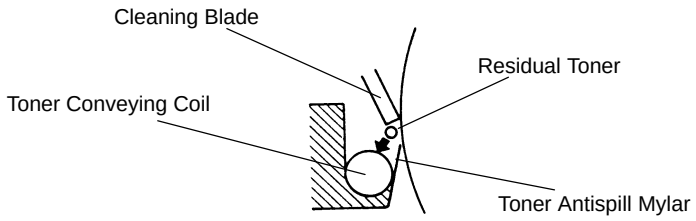
1156SBM1601A

16-1. Spent Toner Collection

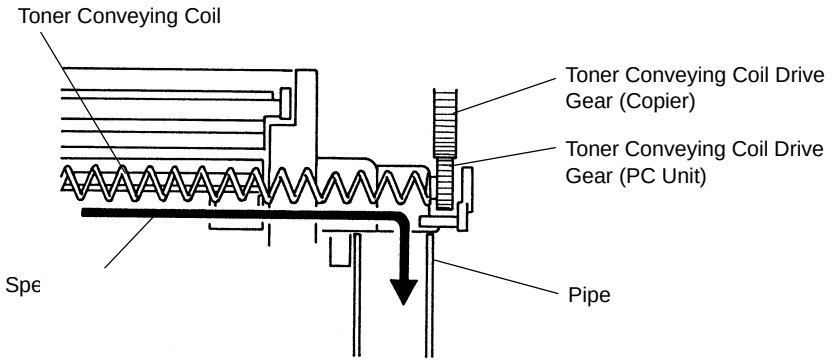
(1) Toner Conveying/Collecting Mechanism

D The toner which has been scraped off the surface of the PC Drum by the Cleaning Blade is conveyed by the Toner Conveying Coil towards the rear of the copier and falls into the Toner Collecting Box at the back of the copier through the pipe.

D The Toner Antispill Mylar is affixed under the Cleaning Blade to receive toner, thus preventing any toner from failing down onto the surface of the copy paper or the paper path.



1136M061AA



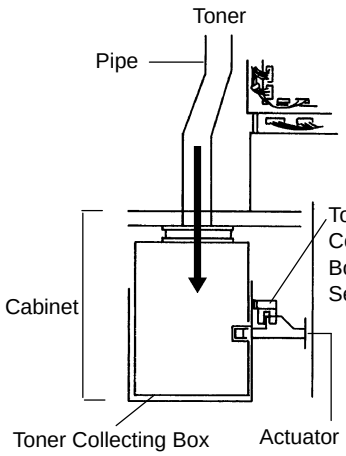
1136M062AA

D The type of Toner Collecting Box and the method of detecting an installed box differ between the applicable marketing areas. See the following table.

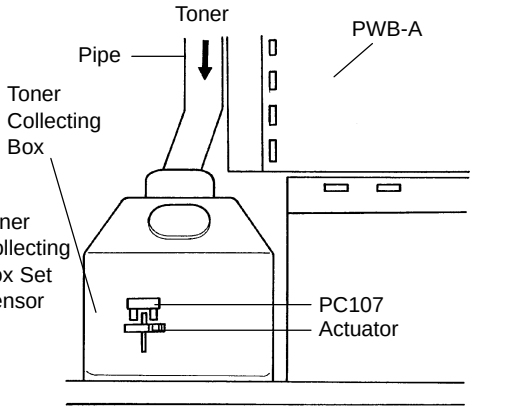
	Areas	Type of Box	Box-in-Position Detection
EP5000	All areas	Large-Capacity Toner Collecting Box (in Cabinet)	PC31 (in Cabinet)
EP4000	U.S.A., Canada, and Europe	Large-Capacity Toner Collecting Box (in Cabinet)	PC31 (in Cabinet)
	Other areas	Standard Toner collecting Box (in copier)	PC107 (in Copier)

(2) Detection of Toner Collecting Box in Position

D Provided inside the Paper Feed Cabinet (in the copier for EP4000 for the areas other than the U.S.A., Canada, and Europe) is a Toner Collecting Box Set Sensor. If no box is installed, the sensor causes a warning message to appear on the Touch Panel and the initiation of a new copy to be inhibited.



1134M030AA



(EP4000, except U.S.A., Canada, and Europe)

1134M037EA

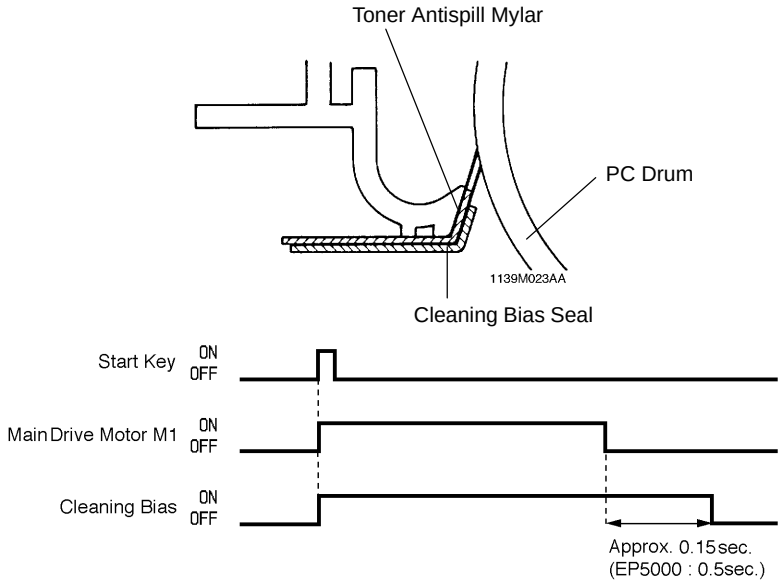
Controlled Part	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC107	PWB-A PJ19A-9	L	H	21-F

1156SBM1602A

16-2. Cleaning Bias (Optional)

* Except the U.S.A., Canada, and Europe

A Cleaning Bias Seal is optionally available that can be fitted to reduce damage to the PC Drum from acid paper.

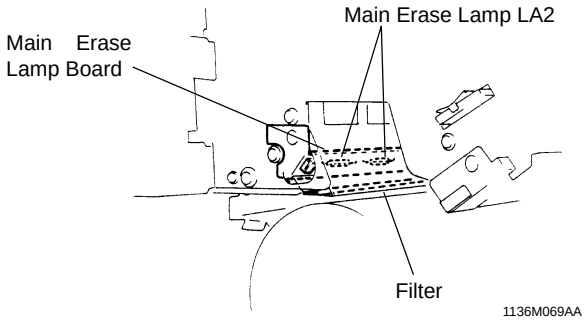


	Control Signal	ON	OFF	WIRING DIAGRAM
Cleaning Bias	HV1	L	H	3-F

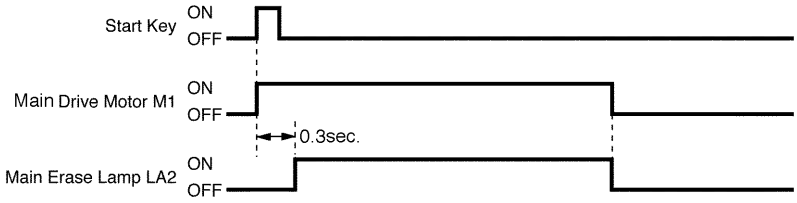
1156SBM1700A

17 MAIN ERASE LAMP

Main Erase Lamp LA2 is turned ON to neutralize any surface potential remaining on the surface of the PC Drum after cleaning.



D Main Erase Lamp LA2 consists of ten tungsten filament lamps mounted side-by-side on a board. A filter is installed between LA2 and the PC Drum to protect LA2 from contamination.

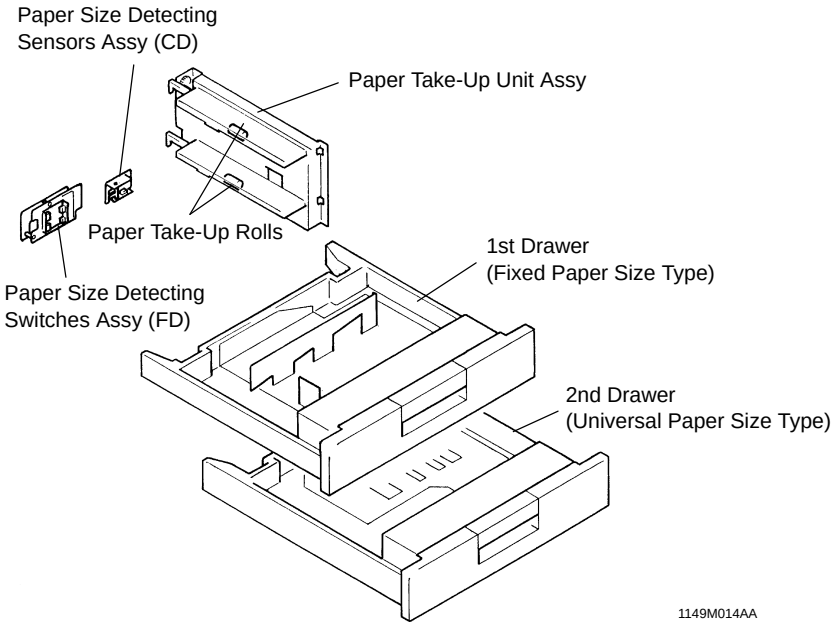


	Control Signal	ON	OFF	WIRING DIAGRAM
LA2	PWB-A PJ12A-3	H	L	1-L

1156SBM1800A

18 PAPER TAKE-UP/FEED SECTION

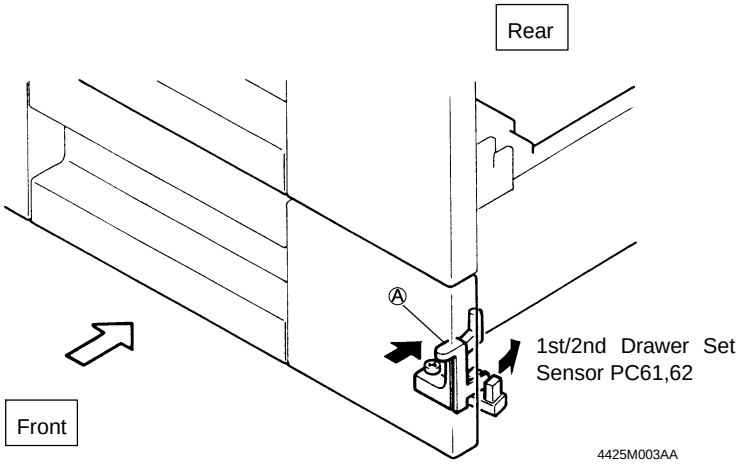
The copier is equipped with two paper drawers that slide out to the front of the copier. The 1st Drawer is a fixed paper size type, while the 2nd Drawer is a universal paper size type.



1156SBM1801A

18-1. Drawer-in-Position Detection

D When the drawer is slid into the copier, Drawer Set Detecting Lever A is pushed in the direction of the arrow, which blocks the Drawer Set Sensor (PC61/PC62, goes LOW).



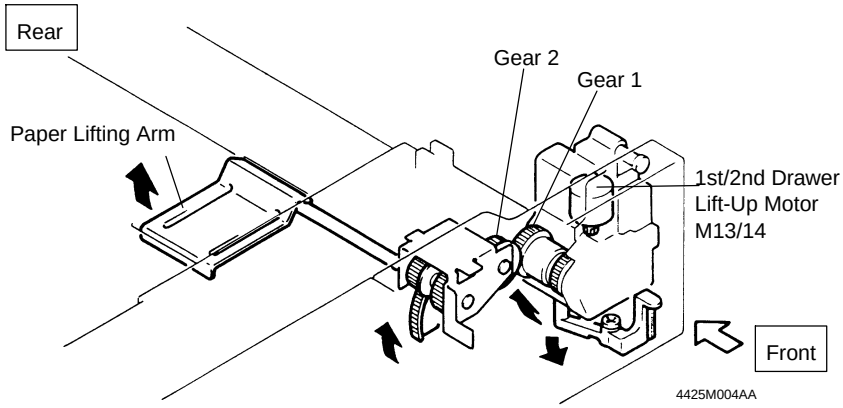
	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC61	PWB-A PJ22A-2	L	H	25-P
PC62	PWB-A PJ22A-6	L	H	25-P

1156SBM1802A

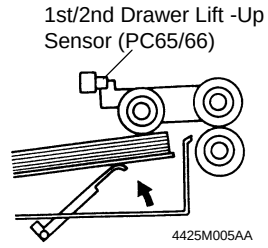
18-2. Drawer Paper Lifting/Lowering Mechanism/Control

(1) Metric Areas

- **D** The paper lifting mechanism raises the paper in the drawer so that the top of the paper stack is pressed against the Paper Take-Up Roll at a constant pressure.
- **D** When slid into the copier, the drawer presses the Drawer Set Lever which engages Lift-Up Motor Gear 1 with Paper Lifting Arm Gear 2.
- **D** At the same time, the Drawer Set Sensor (PC61 /PC62) is blocked (goes LOW) and after 1 msec., the Lift-Up Motor (M13/M14) starts turning, causing the Paper Lifting Arm to raise the Paper Lifting Plate.
- **D** When the drawer is slid out, Lift-Up Motor Gear 1 is disengaged from Paper Lifting Arm Gear 2, lowering the Paper Lifting Plate.

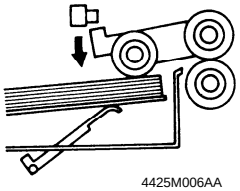


When Drawer is Slid in



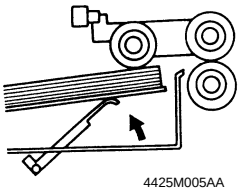
- **D** The Paper Lifting Arm further raises the paper after the top sheet of paper is pressed against the Paper Take-Up Roll. As the light blocking plate blocks the Lift-Up Sensor (goes LOW), the Lift-Up Motor (M13/M14) stops.

During Copying



4425M006AA

D As sheets of paper are used, the Paper Take-Up Roll lowers accordingly, unblocking the Lift-Up Sensor (PC 65/66 goes HIGH).



4425M005AA

D The Lift-Up Motor (M13/14) starts running, raising the paper stack until the Lift-Up Sensor (PC65/66) is blocked (output goes LOW).

D Energizing and deenergizing of the Lift-Up Motor keeps constant the pressure between the Paper Take-Up Roll and paper regardless of the height of the paper stack.

	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC65	PWB-A PJ21A-2A	L	H	25-N
PC66	PWB-A PJ21A-2B	L	H	32-K

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M13	PWB-A PJ18A-5	L	H	25-M
M14	PWB-A PJ18A-7	L	H	25-M

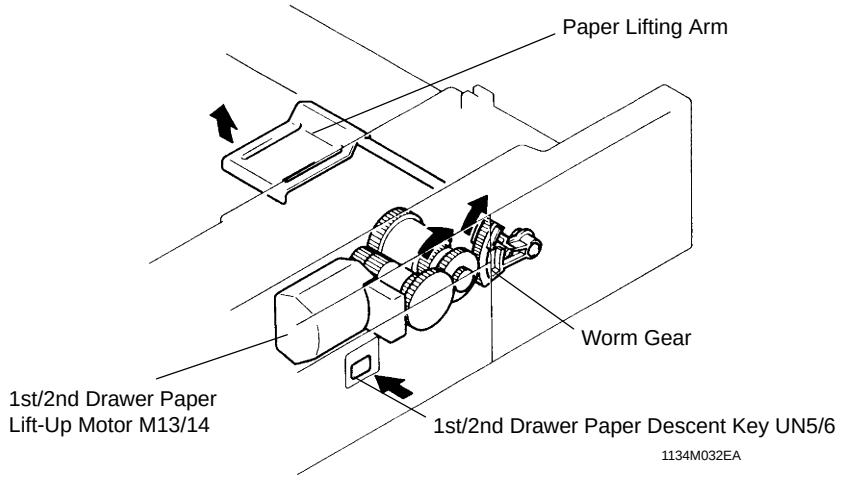
(2) Inch Areas

<Paper Stack Lifting>

- **D** When the Paper Descent Key (UN5/6) is pressed*1 after the drawer has been slid into the copier, it energizes the Lift-Up Motor (M13/14) and the motor starts turning forward.
- **D** The rotation of the motor is transmitted via a gear train to the worm gear and the Paper Lifting Arm mounted on the same shaft, raising the Paper Lifting Plate. This raises the paper stack.
- **D** When the top of the paper stack is pressed against the Paper Take-Up Roll and the paper stack is further raised, the light blocking plate of the Paper Take-Up Roll Assy blocks the Lift-Up Sensor (PC65/66). This deenergizes the Lift-Up Motor and the paper stack raising motion is completed.
- **D** As the paper is consumed and the top level of the paper stack lowers, the Lift-Up Sensor is unblocked. Then, the Lift-Up Motor is energized again to raise the paper stack until the Lift-Up Sensor is blocked again. This means that a constant pressure is maintained between the paper and the Paper Take-Up Roll regardless of the amount of paper still available for use.

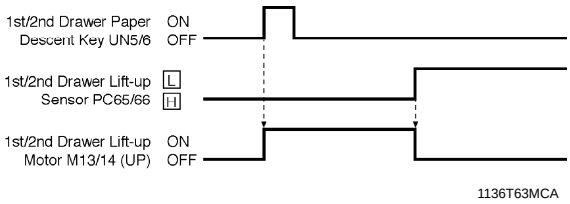
*1: The Lift-Up Motor is energized at the following timings, in addition to the press of the Paper Descent Key (UN5/6).

- **D** Turning ON the Power Switch
- **D** Opening and closing the door
- **D** Operating the panel
- **D** Detecting a sheet of paper on the Multi Bypass Table
- **D** Detecting an original in the Duplexing Document Feeder
- **D** Raising and lowering the Original Cover, etc.



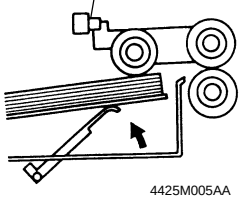
D Paper lifting timings are as follows

When Drawer is Slid in



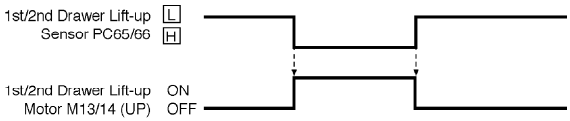
1136T63MCA

1st/2nd Drawer Lift-Up Sensor PC65/66

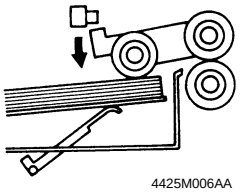


4425M005AA

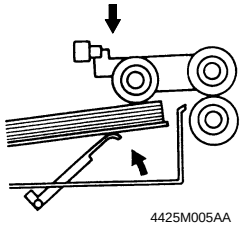
During Copying



1136T64MCA



4425M006AA



4425M005AA

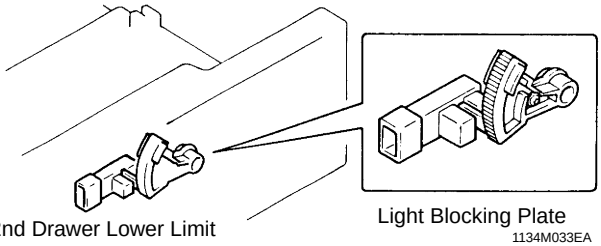
	Control Signal	OFF	ON	WIRING DIAGRAM
UN5	PWB-A PJ24A-3	L	H	41-I
UN6	PWB-A PJ24A-4	L	H	41-M

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M13	PWB-A PJ18A-5	L	H	25-M (41-K)
M14	PWB-A PJ18A-7	L	H	25-M (41-O)

<Paper Stack Lowering/Drawer Lock>

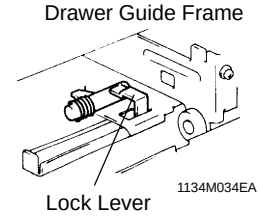
z Paper Stack Lowering

- **D** When the Paper Descent Key (UN5/6) is pressed or the drawer runs out of paper during a copy cycle, the Lift-Up Motor (M13/14) is energized to turn backward.
- **D** The rotation of the motor is transmitted via a gear train to the worm gear and Paper Lifting Arm mounted on the same shaft, lowering them.
- **D** When the Lower Limit Position Sensor (PC70/71) is blocked by the light blocking plate of the worm gear, it deenergizes the Lift-Up Motor (M13/14). This completes the paper stack lowering motion (at a paper-empty condition).
- **D** When the Paper Descent Key (UN5/6) is pressed, the Lift-Up Motor is deenergized when the Lower Limit Position Sensor (PC70/71) is unblocked after it has been blocked. This unlocks the drawer. (For more details, see "Drawer Locking Mechanism" that follows.)



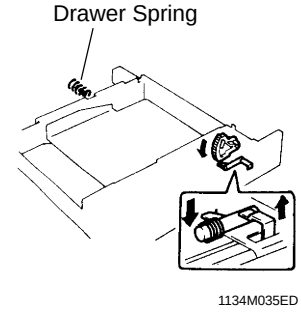
z Drawer Locking Mechanism

When Drawer is Slid in



- **D** The Lock Lever on the bottom of the drawer contacts the Drawer Guide Frame of the copier and slides over the frame.
- **D** The drawer is locked in the copier when the Lock Lever drops into the slot in the Drawer Guide Frame.

When Drawer is Unlocked



- **D** Pressing the Paper Descent Key (UN5/6) starts the paper lowering motion.
- **D** The worm gear is turned downward until its light blocking plate has passed through and below the Lower Limit Position Sensor (PC70/71), blocking and then unblocking it. This is so the worm gear can reach down low enough to push the Lock Lever downward and unlock the drawer.
- **D** When the drawer is unlocked, the Drawer Spring in the rear of the drawer pushes the drawer out to the front approx. 70 mm.
- **D** Once the drawer is pushed out, the drawer Set Sensor (PC61/62) is unblocked. This reverses the Lift-up Motor (M13/14) and briefly turns the worm gear upward until its light blocking plate reblocks the Lower Limit Position Sensor (PC70/71), returning the Lock Lever to the locking position.

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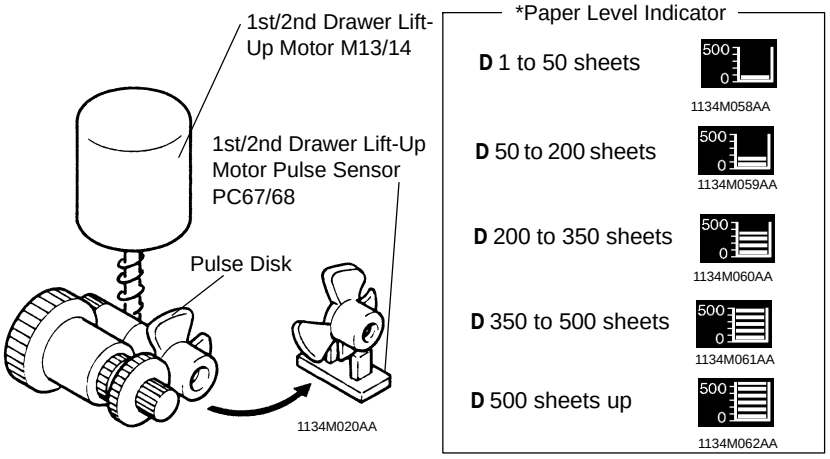
18-3. Paper Level Detection

- **D** The amount of paper still available for use, or the paper level, of the 1st and 2nd Drawer is detected by 1st/2nd Drawer Lift-Up Motor Pulse Sensor PC67/68 and a pulse disk.
- **D** The pulse disk is mounted on the shaft of the intermediary gear that transmits drive from the Lift-Up Motor (M13/14). The speed of the pulse disk varies with different paper levels and the number of pulses detected by the Lift-Up Motor Pulse Sensor (PC67/68) is used to determine the paper level.
- **D** Counting of the number of pulses is started when the Lift-Up Motor (M13/14) is energized and continues until the output from the Lift-Up Sensor (PC65/66) goes LOW. The total number of pulses is translated into the amount of paper which is shown on the Touch Panel as a graphic marker in units of 50 sheets of paper.
- **D** As the paper is consumed and the top level of the paper stack lowers, the Lift-Up Motor is energized to raise the paper stack. During this time, the Lift-Up Motor Pulse Sensor (PC67/68) detects pulses and that pulse count is accumulated. When the count reaches 50 sheets of paper, one segment of the paper level indicator on the Touch Panel goes out.



	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC67	PWB-A PJ23A-2	L	H	32-I (41-K)
PC68	PWB-A PJ23A-5	L	H	32-J (41-N)

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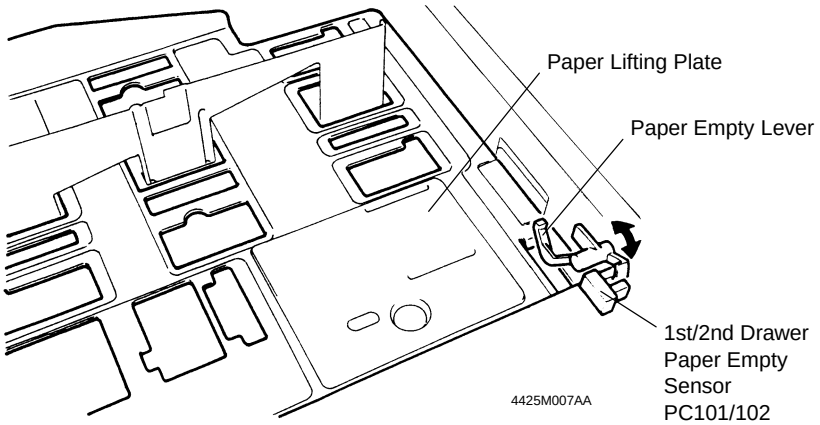
18-4. Paper Empty Detection

(1) Metric Areas

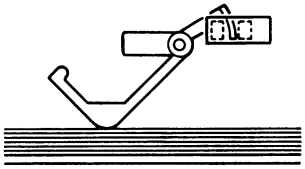
- **D** A paper empty condition in the 1st and 2nd Drawers is detected by 1st Drawer Paper Empty Sensor PC101 and 2nd Drawer Paper Empty Sensor PC102, respectively, installed in the paper take-up area of each drawer.
- **D** When the drawer, with no paper loaded in it, is roughly slid out of the copier, the Paper Empty Lever can hit against the Paper Lifting Plate. To prevent this from occurring, the Paper Empty Lever is tilted in the direction of sliding.



PC101/102 (blocked)

Paper Present

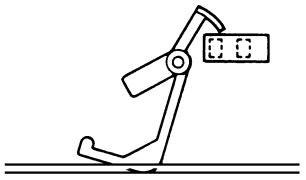
The paper stack raises the Paper Empty Lever which blocks PC101/102 (goes LOW).



PC101/102 (unblocked)

Paper not Present

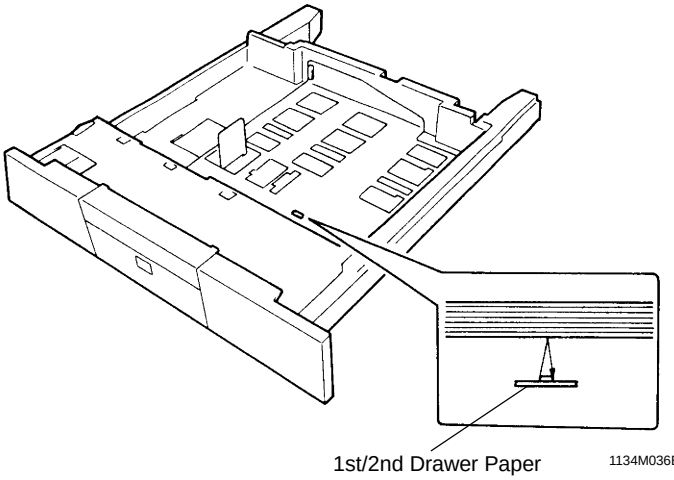
The light blocking plate of the Empty Lever clears PC101/102 which goes HIGH.



	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC101	PWB-A PJ23A-9	L	H	32-J
PC102	PWB-A PJ23A-12	L	H	32-K

(2) Inch Areas

- **D** A paper empty condition in the 1st and 2nd Drawers is detected by 1st Drawer Paper Empty Board PWB-E1 and 2nd Drawer Paper Empty Board PWB-E2, respectively, installed on the underside of the Paper Lifiting Plate.
- **D** The board is provided with a reflector type photosensor. When the drawer is loaded with paper, the photosensor is activated by the light reflected off the paper. The copier then detects that there is paper in the drawer.
- **D** If no paper is loaded, the copier detects that the drawer is paper-empty and, at the same time, the Lift-Up Motor (M13/14) starts turning backward to lower the Paper Lifting Plate.
- **D** When a paper-empty condition is detected during a multi-copy cycle and if there is another paper source (including options) loaded with paper of the same size and in the same direction, the copier automatically selects that second paper source to ensure an uninterrupted copy cycle (Automatic Drawer Switching).



	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PWB-E1	PWB-A PJ23A-9	L	H	42-L
PWB-E2	PWB-A PJ23A-12	L	H	42-P

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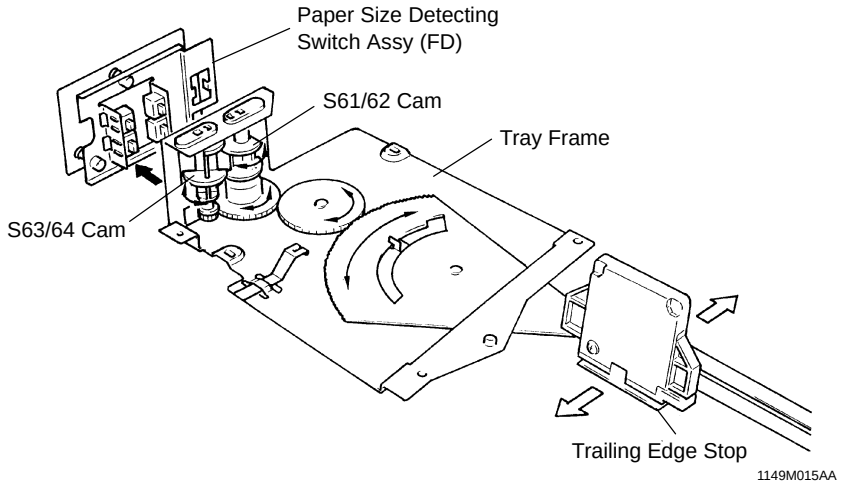
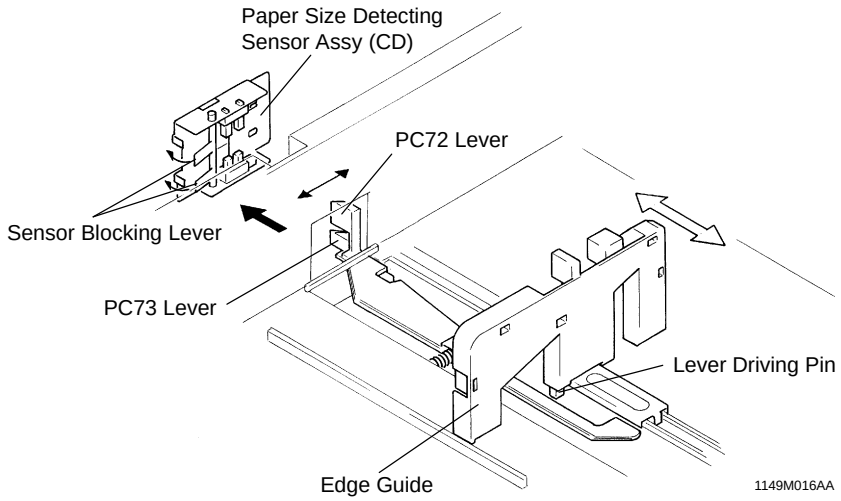
18-5. Universal Tray (2nd Drawer) Paper Size Detection

- **D** The length (feeding direction) and width (crosswise direction) of the paper are independently detected and the copier determines the paper size by combining the two separate detections made. The “Universal Tray 13”x or 14x” function of “Tech. Rep. Choice” must be set for the width (CD) of FLS (13” or 14” long in the feeding direction).
- **D** On the bottom of the tray is a lever fitted to the Trailing Edge Stop and another lever fitted to the Edge Guide. These levers actuate (activate) and deactuate (deactivate) the paper size detecting switches (and sensors) to allow the copier to determine a particular paper size.

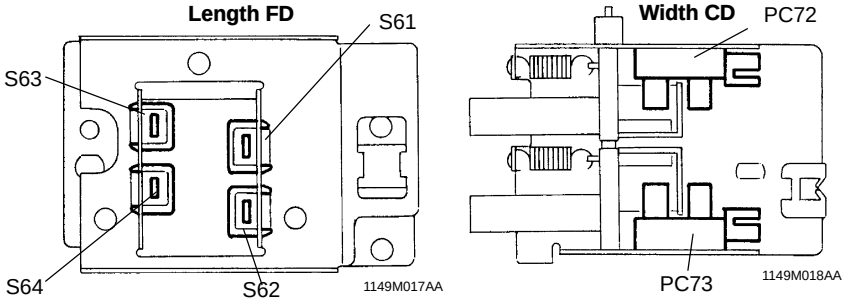
Detection in the Feeding Direction



Detection in the Crosswise Direction



D Paper Size Detecting Switches/Sensors



D Details of Paper Size Detecting Switches/Sensors Operation and Detectable Paper Sizes

Paper Size Name	Inch Size	CD FD (mm)	Paper Size Detecting Switches/Sensors					
			Length (FD)				Width (CD)	
			S61	S62	S63	S64	PC72	PC73
A5L (Invoice L)*2	(5-1/2" 8-1/2")	148 210 (140 216)	f	□	f	□ / f	f	f
B5L	□	182 257	f	f	□	□	f	f
B5C	□	257 182	f	□	□	□	□	□
A4L	□	210 297	□	f	□	f	□	□
A4C	□	297 210	f	□	f	□	f	□
B4L	□	257 364	□	□	□	□	□	□
A3L	□	297 420	□	□	f	f	f	□
Quarto C	10" 8"	254 203	f	□	f	□	□	□
G.Letter L	8" 10-1/2"	203 267	f	f	f	□	□	□
G.Letter C	10-1/2" 8"	267 203	f	□	f	□	□	f
Folio*	8-1/4" 13"	210 330	□	f	f	f	□	□
Letter L	8-1/2" 11"	216 279	f	f	f	f	□	□
Letter C	11" 8-1/2"	279 216	f	□	f	f	□	f
Legal*	8-1/2" 14"	216 356	□	□	□	f	□	□
11 14	11" 14"	279 356	□	□	□	f	□	f
Ledger	11" 17"	279 432	□	□	f	f	□	f
Comp Form	11" 15"	279 381	□	□	□	□	□	f
Korean FLS L	□	192 268	f	f	f	□	f	f
FLS*	8" 13"	203 330	□	f	f	f	□	□
Hongkong FLS L*	8-1/2" 13"	216 330	□	f	f	f	□	□
G.Legal L*	8-1/2" 13"	216 330	□	f	f	f	□	□
Folio (Eu.)*	8-1/4" 14"	210 356	□	□	□	f	□	□

Switch operation **f** : Actuated; □ : Deactuated
Sensor operation **f** : Blocked; □ : Unblocked
*A Tech. Rep. Choice function must be set for the size in the crosswise direction. L: Lengthwise; C: Crosswise
*2Metric Areas: A5L
Inch Areas: Invoice L

	Control Signal	Actuated	Deactuated	WIRING DIAGRAM
S61	PWB-A PJ26A-2	L	H	25-J
S62	PWB-A PJ26A-4	L	H	25-I
S63	PWB-A PJ26A-7	L	H	25 I
S64	PWB-A PJ26A-9	L	H	25-H

	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC72	PWB-A PJ25A-2	L	H	25-K
PC73	PWB-A PJ25A-5	L	H	25-J

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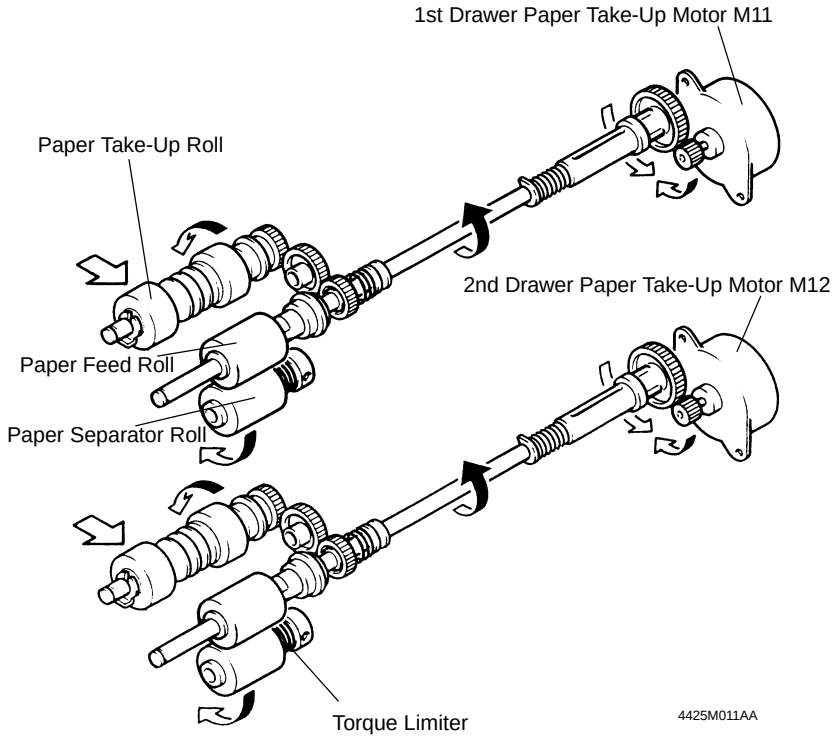
18-6. Paper Take-Up Mechanism

(1) Paper Take-Up Mechanism

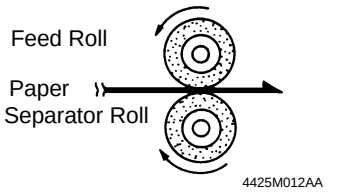
- **D** The paper take-up and feeding mechanism takes up paper from the drawer and feeds it to the Vertical Transport Roller.
- **D** The take-up mechanism is driven by 1st/2nd Drawer Paper Take-Up Motor M11/12.
- **D** Each paper take-up mechanism consists of a Paper Take-Up Roll, Feed Roll and Separator Roll with torque limiter.
- **D** The Separator Roll is controlled by the torque limiter so that it will not transport more than one sheet of paper at a time.



(2) Paper Separating Mechanism

- **D** The paper separating mechanism ensures that only the top sheet of paper is fed in by separating the second sheet of paper from the top one.
- **D** This is accomplished by the difference in friction coefficient between the first and second sheets of paper.

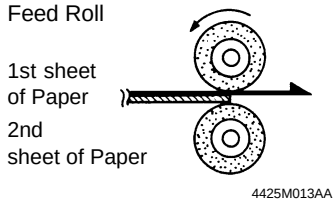
<Normal Feeding>



Driven or stationary

- **D** When only one sheet of paper is fed, the friction coefficient on the top side of the paper is equal to that on the underside.
- **D** Driven by the Feed Roll, the paper drives the Separator Roll. This causes the paper to be sent to the Vertical Transport Section.
- **D** The friction coefficient varies for different ambient conditions and types of paper being used, which often causes the Separator Roll to be stationary.

<Double Feeding>



Separator Roll

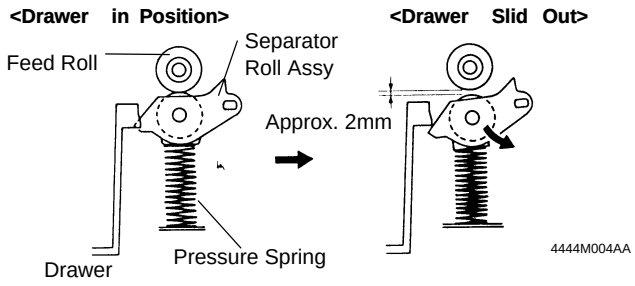
Stopped

- **D** Since the coefficient of friction between the top side of the first sheet of paper and the Feed Roll is greater than that between the first and second sheets of paper, the first sheet of paper is fed into the copier by the Feed Roll.
  Since the friction coefficient between the second sheet of paper and the Separator Roll is greater than that between the first and second sheet of paper, the Separator Roll is not driven and holds the second sheet of paper.

(3) Paper Pressure Releasing Mechanism

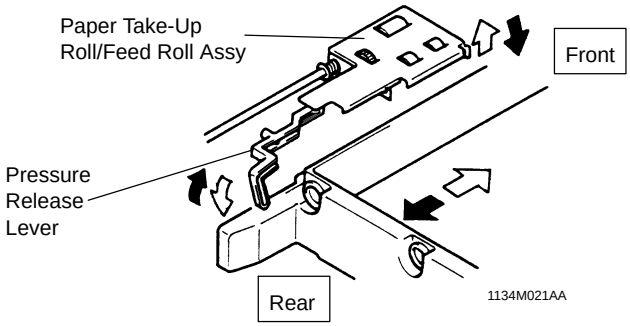
D If the drawer is pulled out while the paper is between the Feed Roll and the Separator Roll, the paper is left in the copier. Removal of the paper is difficult. With this copier, sliding out the drawer automatically disengages the paper and Paper Take-Up/Feed Roll.

D The Paper Pressure Releasing Mechanism makes it easier to remove a sheet of paper held between the Feed Roll and Paper Separator Roll by just sliding out the drawer. When the drawer is pulled out, the pressure release rail pushes down the Separator Roll Assy, disengaging the Feed Roll from the Separator Roll.



(4) Paper Take-Up Roll Retraction Mechanism

D When the drawer is slid out, the rear end of the drawer on the take-up side and the Pressure Release Lever push up the Paper Take-Up Roll/Feed Roll, freeing the paper from the Paper Take-Up Roll.



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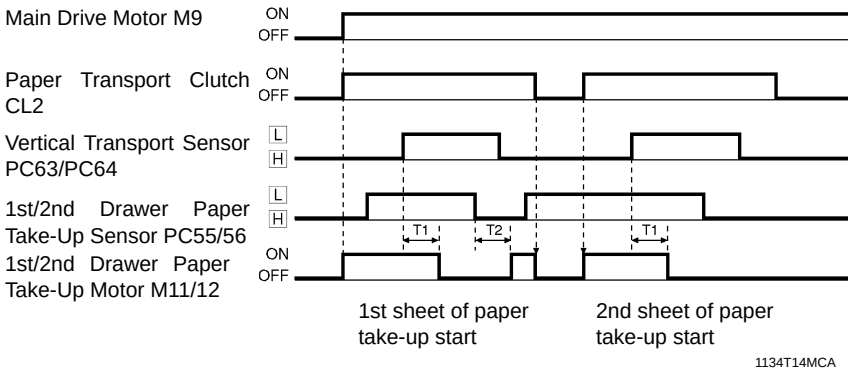
18-7. Drawer Paper Take-Up Control

(1) Paper Take-Up Motor Control

D A stepping motor is used for the Paper Take-Up Motor (M11/12). Each motor is turned forward or backward by energizing its four internal coils using the pulse signals output from Master Board PWB-A.



1134T14MCA

T1: 5 msec.
(Paper take-up off timer)
T2: 5 msec.
(Paper take-up interval timer)

	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC51	PWB-A PJ19A-5	L	H	32-M
PC55	PWB-A PJ19A-2	L	H	32-N
PC56	PWB-A PJ21A-5A	L	H	25-N
PC63	PWB-A PJ21A-8A	L	H	25-O
PC64	PWB-A PJ21A-8B	L	H	32-M

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
M11	PWB-A PJ16A-1	Pulse output		25-K
M12	PWB-A PJ16A-2	Pulse output		25-L

(2) Paper Take-Up Retry Control

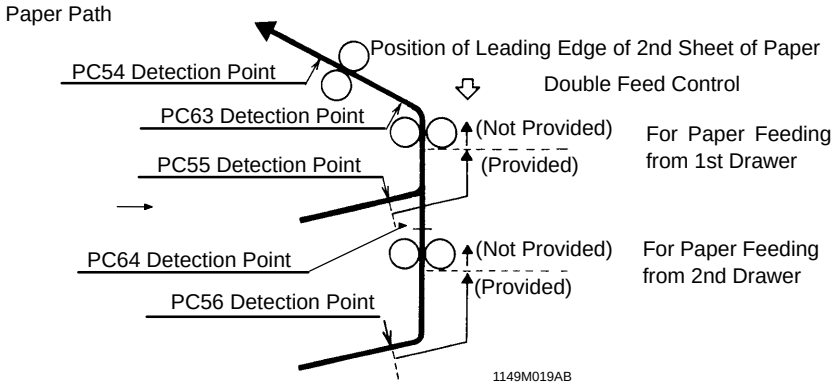
- **D** To minimize the occurrence of a paper misfeed due to a slippery Paper Take-Up Roll, the Paper Take-Up Motor (M11/12) is kept deenergized for a given period of time before it is energized again, if a sheet of paper fails to reach the Paper Take-Up Sensor (PC55/56) even after the lapse of a given period of time after the motor has first been energized (paper take-up retry control).
- **D** A misfeed results if the sheet of paper does not reach the Paper Take-Up Sensor even after three paper take-up sequences.

(3) Paper Take-Up Interval Control

- **D** The Paper Feed Roll and Separator Roll may sometimes fail to separate the subsequent sheet of paper properly and the leading edge of that paper may be beyond the Feed and Separator Rolls inside the copier. If the next paper take-up sequence is started in this condition, the distance between the preceding and the current sheet of paper will become shorter than normal, resulting in a misfeed.
- **D** To maintain a given paper take-up interval, therefore, this copier provides the following control. If it takes the paper less than a specified time to block ([L]) PC55/56 after M11/12 has been energized, M11/12 is temporarily deenergized and, an appropriate period of time thereafter, it is energized again (paper take-up interval control).

(4) Double Feed Paper Take-Up Control

- **D** Even if the Paper Take-Up Roll takes up two sheets of paper at one time, the double feed paper take-up control uses the second sheet of paper for the next copy cycle without causing a paper misfeed. It eliminates a paper misfeed that would otherwise result when two sheets of paper are taken up at once.
- **D** If the second sheet of paper is stationary blocking PC55/56 when the trailing edge of the first sheet of paper moves past Vertical Transport Sensor PC63/PC64, the copier determines that it is a double feed condition and provides double feed control.
- **D** If, however, the second sheet of paper has reached the Vertical Transport Roller, the double feed control is not provided since the paper is fed further into the copier by the Vertical Transport Roller. This could result in a paper misfeed or the second sheet of paper being fed through the copier with the first one.



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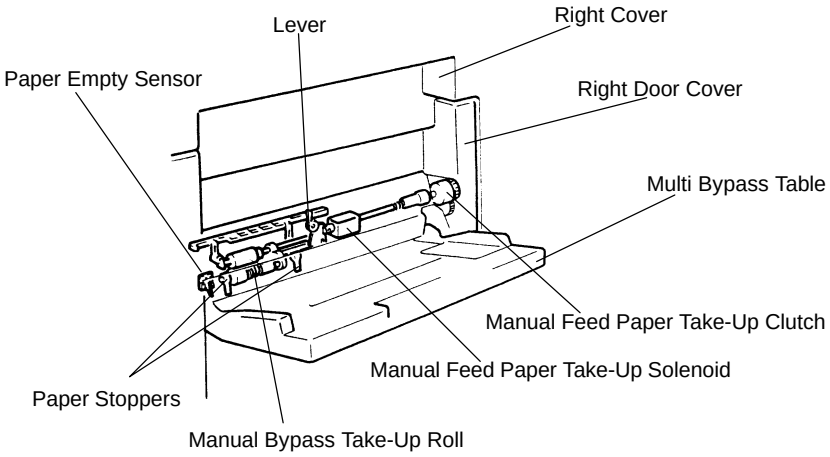
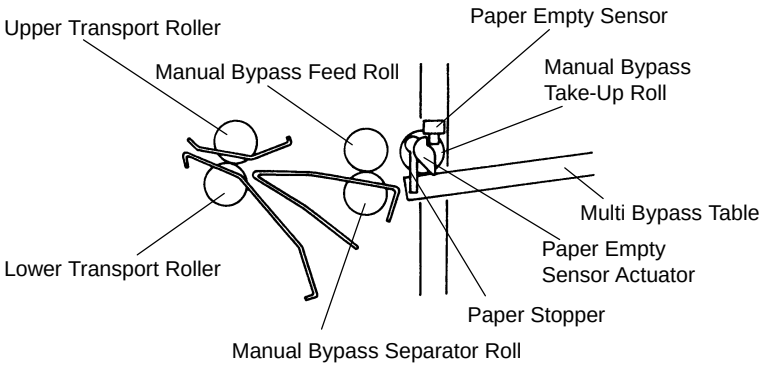
19 MULTI BYPASS TABLE

Construction

The Multi Bypass Table fitted to the Right Door of the copier, is integrated into the copier. It is constructed as follows.



1136M045AA



1136M088AA

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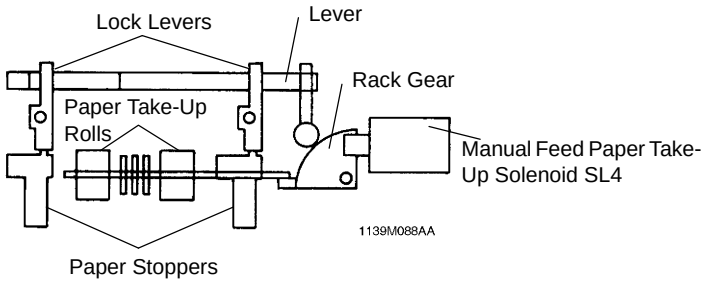
19-1. Paper Take-Up Mechanism

The Paper Take-Up Rolls are normally in their raised (retracted) position so that they will not hamper proper loading of paper. When the Start Key is pressed, Manual Feed Paper Take-Up Solenoid SL4 is deenergized causing the Paper Take-Up Rolls to press the paper stack downward and take up a sheet of paper.

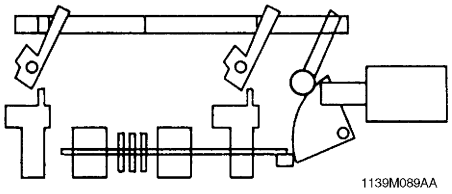
Paper Stoppers are provided that block the leading edge of the paper stack as it is loaded on the Table, preventing any portion of the leading edge of the paper from getting inside. These Stoppers are unlocked at paper take-up, allowing paper into the copier.

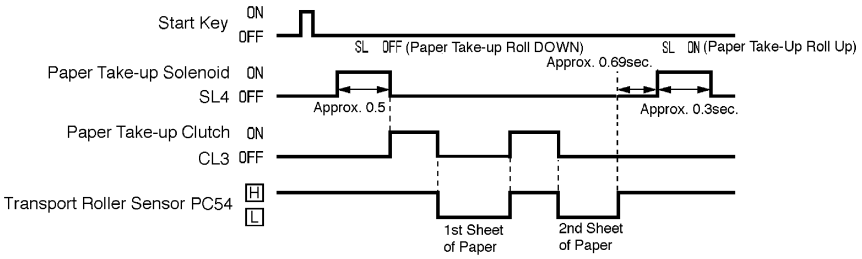
Manual Feed Paper Take-Up Clutch CL3 controls the turning and stop of the Paper Take-Up Rolls.

In Standby



At Take-Up





	Control Signal	Energized	Deenergized	WIRING DIAGRAM
CL3	PWB-A PJ15A-12	L	H	32-P
SL4	PWB-A PJ15A-9	L	H	32-P
SL4	PWB-A PJ15A-10	L	H	

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19-2. Paper Separating Mechanism

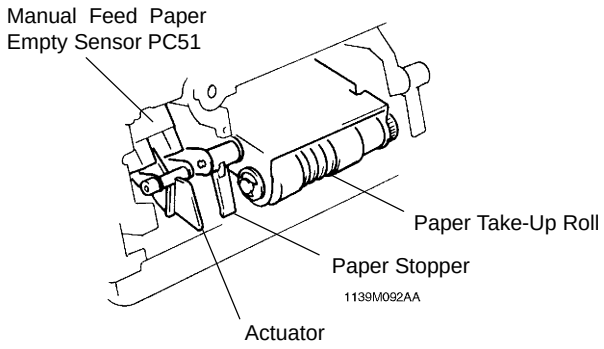
The paper separating mechanism ensures that only the top sheet of paper is fed in by separating the second sheet of paper from the top one. This is accomplished by the Torque Limiter fitted to the Separator Roll shaft which stops the Separator Roll when there is a change in friction between the Feed and Separator Rolls.

*For details of the paper separating mechanism, see ”18. PAPER TAKE-UP/FEED SECTION.”

1156SBM1903A

19-3. Paper Empty Detection

The Multi Bypass Table is equipped with Manual Feed Paper Empty Sensor PC51 which detects a sheet of paper at the manual bypass port.



	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC51	PWB-A PJ15A-14	H	L	32-O

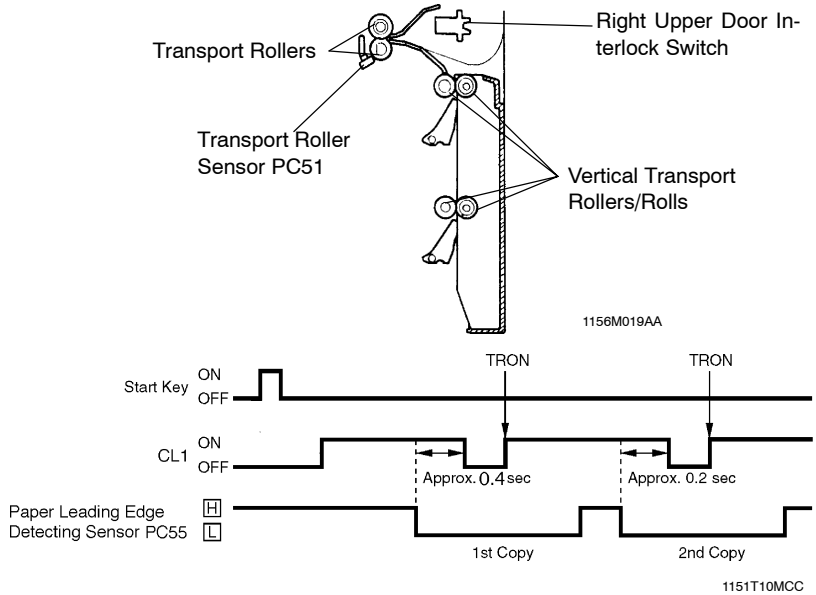
1156SBM2000A

20 VERTICAL PAPER TRANSPORT

The sheet of paper taken up by the Paper Take-Up Roll from the Drawer is fed along the Paper Guide to the Vertical Transport Rollers. The paper fed by the Vertical Transport Rollers reaches the Transport Rollers and is then fed up to the Synchronizing Rollers. The Transport Rollers are turned and stopped by Paper Transport Clutch CL1. The Transport Rollers are coupled to the Vertical Transport Rollers by way of gears, meaning that the Vertical Transport Rollers are turned and stopped in time with the Transport Rollers. Transport Roller Sensor PC54 immediately after the Transport Rollers detects a sheet of paper fed from the Vertical Transport Section or Manual Bypass Table.

A Paper Dust Remover is fitted to one of the Transport Rollers, collecting paper dust from the rollers.

The Cover for the Vertical Transport Section (i.e., the Side Door) can be opened and closed for clearing misfeeds. Right Upper Door Interlock Switch S22 detects whether or not this Cover is open.



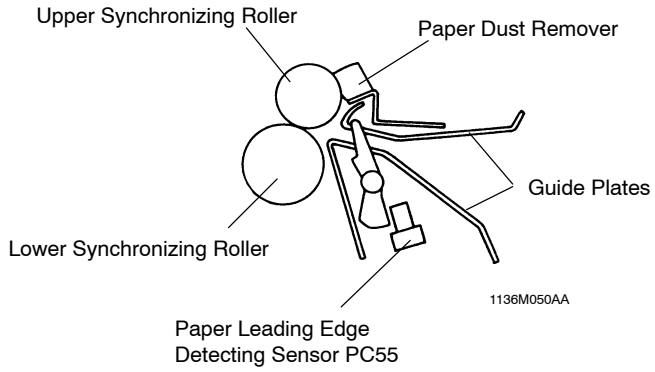
	Control Signal	Energized	Deenergized	WIRING DIAGRAM
CL1	PWB-A PJ14A-2	L	H	7-F

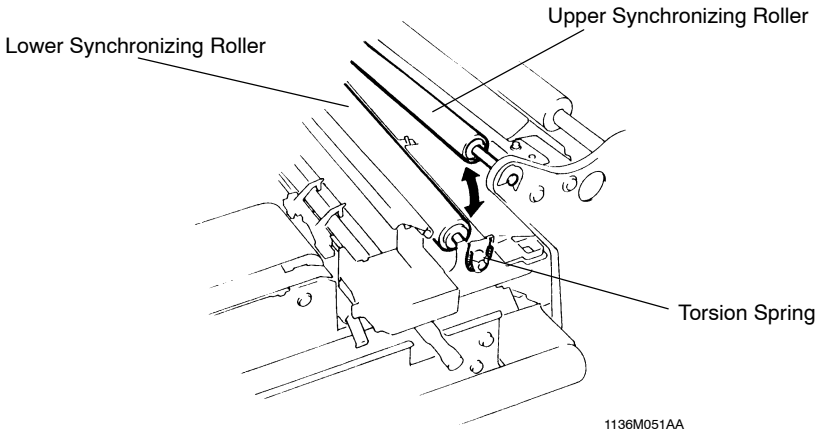
	Control Signal	ON	OFF	WIRING DIAGRAM
S22	PWB-A PJ16A-2	L	H	21-I

1156SBM2100A

21 SYNCHRONIZING ROLLERS

- The Upper Synchronizing Roller is a metal roller covered with a polyvinyl chloride tubing. It is secured to the front and rear frames of the copier.
- The Lower Synchronizing Roller, a rubber roller, is fitted to the Transport Assy. Pivoting about its rear end, the Lower Roller can be swung downward to facilitate clearing paper misfeeds.

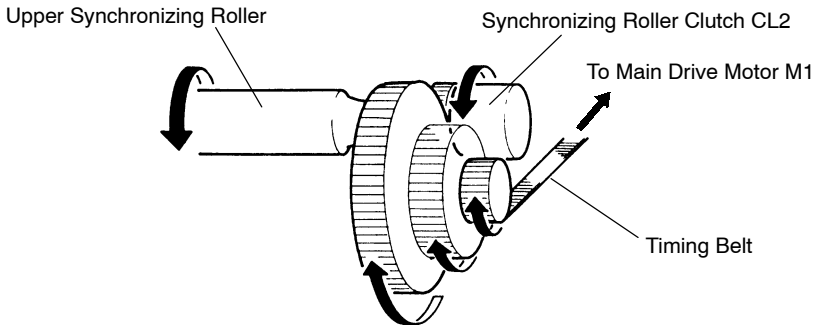




1156SBM2101A

21-1. Synchronizing Roller Drive Mechanism

- The Upper Synchronizing Roller receives drive from Main Drive Motor M1 via a gear train and timming belt. The Upper Roller drives the Lower one.



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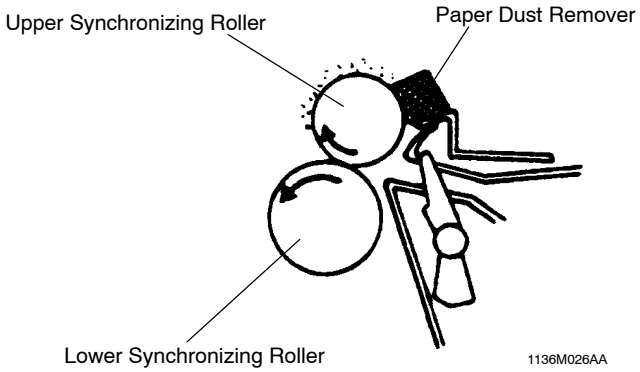
21-2. Paper Dust Remover

The Paper Dust Remover is installed so that it makes contact with the Upper Synchronizing Roller. Since the Upper Synchronizing Roller is covered with a vinyl tubing, triboelectric charging occurs as the Roller turns in contact with the Paper Dust Remover. As paper is then fed between the Synchronizing Rollers, the charges on the tubing attract paper dust from the paper. The dust is then transferred onto the Paper Dust Remover.
The Paper Transport Rollers are also provided with a paper Dust Remover.



1136M026AA

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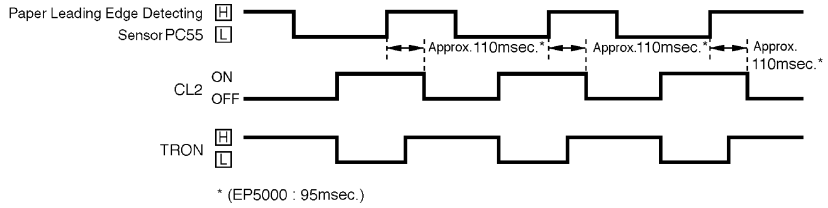
21-3. Synchronizing Roller Control

The Synchronizing Rollers are started as Synchronizing Roller Clutch CL2 is energized upon reception of a signal from PWB-A.



1151T11MCD

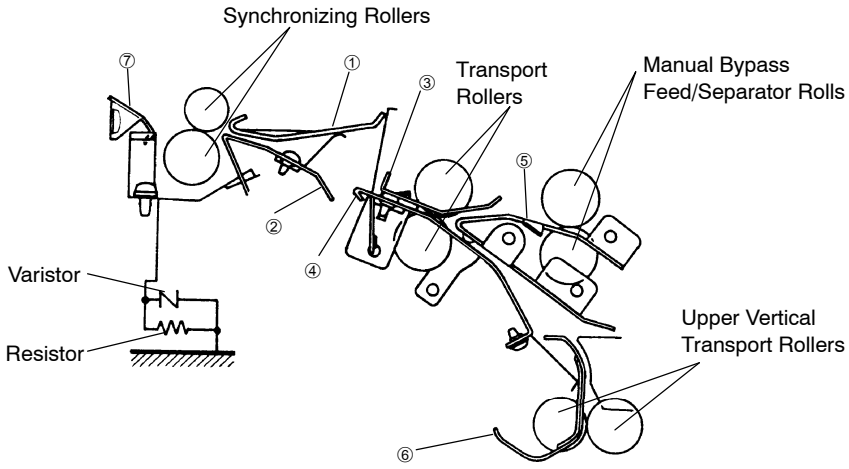
	Control Signal	Energized	Deenergized	WIRING DIAGRAM
CL2	PWB-A PJ14A-4	L	H	7-G

	Control Signal	Blocked	Unblocked	WIRING DIAGRAM
PC55	PWB-A PJ19A-2	L	H	32-N

1156SBM2104A

21-4. Prevention of Low Image Density on Copy

During conditions of high humidity when the paper is damp, charges tend to flow from the Image Transfer Corona through the paper and guide plates to the ground. This results in low image density on the copies. To prevent this from occuring, a plastic spacer is installed between the copier frame and each guide plate around the Synchronizing Rollers so that it remains insulated. Instead of using the plastic spacer, an electrodeposition coating has been applied to some of those guide plates. If, however, the resistance with the ground is made infinity, the guide plate would build up charges and a spark could occur with other guide plates, resulting in a malfunction. To prevent this, a resistor and a varistor are connected to the guide plates. The guide plates are connected by flat springs as illustrated below.



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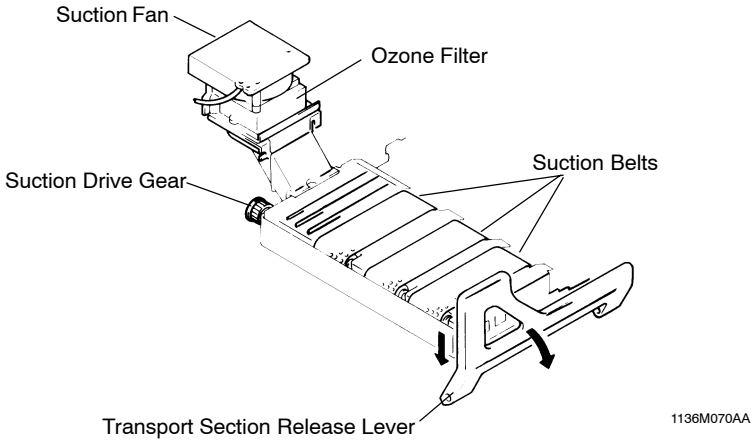
No.	Guide Plate Name	Insulation Method
①	Upper Pre-Synch Guide Plate	Plastic Spacer
②	Lower Pre-Synch Guide Plate	Plastic Spacer
③	Upper Transport Roller Guide Plate	None [Fitted to top of guide plate no. ④]
④	Lower Transport Roller Guide Plate	Plastic Spacer
⑤	Manual Bypass Guide Plate	Electrodeposition Coating
⑥	Vertical Transport Guide Plate	Plastic Spacer
⑦	Pre-Image Transfer Guide Plate	Fitted to plastic holder of Image Transfer/Paper Separator Coronas

Flat Spring	Connection
A	Between varistor-and-resistor and guide plate ⑦
B	Between varistor-and-resistor and guide plate ②
C	Between guide plates ② and ④
D	Between guide plates ② and ①
E	Between guide plates ④ and ⑥

1156SBM2200A

22 PAPER TRANSPORT

- Suction Fan Motor M4 draws the paper onto the turning Suction Belts. It also pulls the paper down as it reaches the Pre-Fusing Guide Plate to ensure that the paper is smoothly fed into the Fusing Unit.
- As M4 turns, ozone produced by the Image Transfer/Paper Separator Coronas is absorbed by the Ozone Filter from the air being drawn out of the copier.

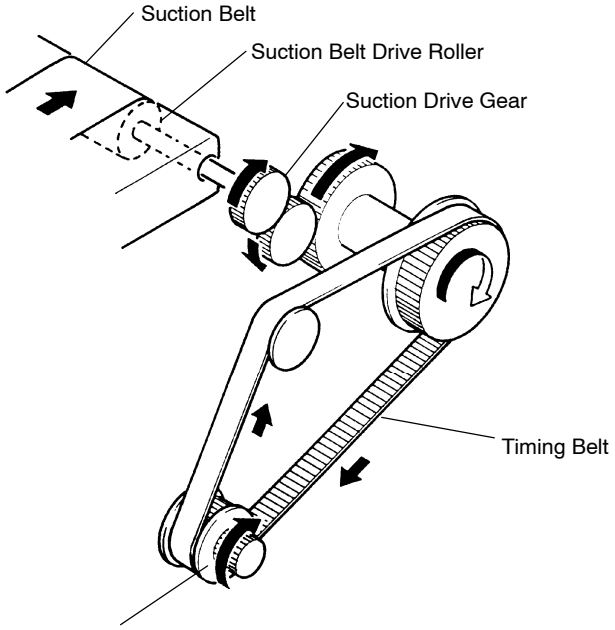


Controlled Part	Control Signal	Half Speed Rotation	Full Speed Rotation	WIRING DIAGRAM
M4	PWB-A PJ15A-4	L	H	21-G

1156SBM2201A

22-1. Suction Belt Drive Mechanism

The Suction Belts are driven by Main Drive Motor M1 through a timing belt and gear train.



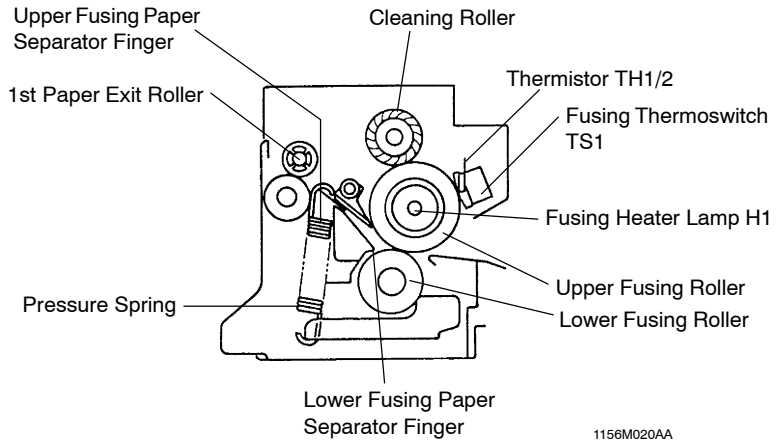
Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
M1	PWB-A PJ18A-9	L	H	2-M

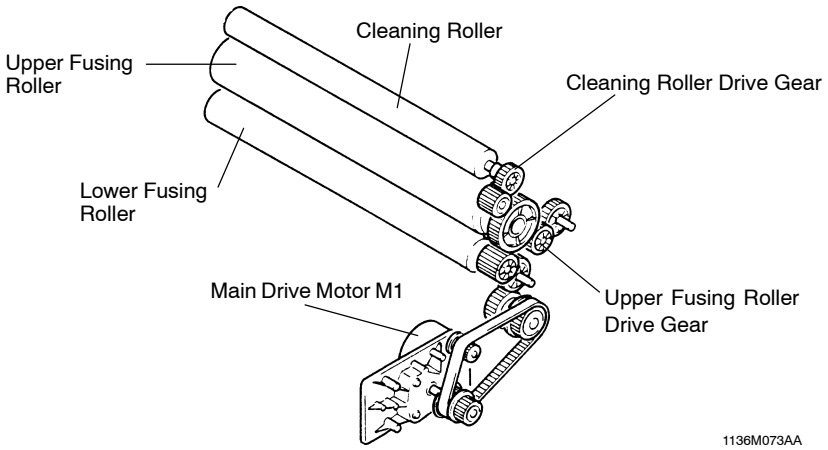
1156SBM2300A

23 FUSING UNIT

The Upper Fusing Roller and Lower Fusing Roller together apply heat and pressure to the toner and paper to permanently fix the developed image to the paper.

Drive for the Upper Fusing Roller is transmitted from the Main Drive Motor to the Upper Fusing Roller Drive Gear. The Lower Fusing Roller and Cleaning Roller are driven by the respective Rollers in contact with them.





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23-1. Fusing Temperature Control

The Upper Fusing Roller is heated by Fusing Heater Lamp H1 which is an AC halogen lamp. Fusing Thermistor 1 TH1 and Thermistor 2 TH2 installed on the Upper Fusing Roller helps keep the optimum fusing temperature.

The fusing temperature is normally controlled at 200°C during a copy cycle and at 190°C in the standby state. To ensure good fusing performance even when the Lower Fusing Roller remains cool immediately after warm up in the early morning, the temperature is controlled as follows when the copier is turned ON.

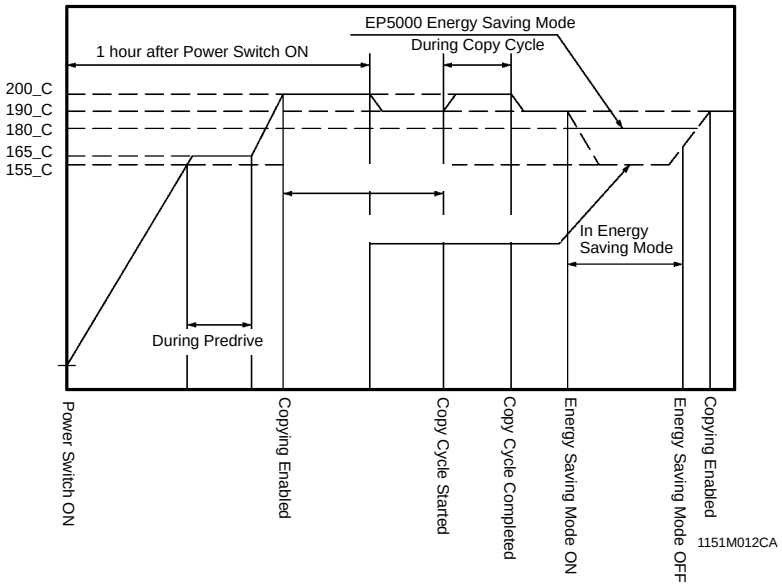
D Temperature is controlled at 200°C for one hour after the copier has completed warming up, which is followed by a temperature control at 190°C.

If a copy cycle is started while the temperature is being controlled at 190°C, the temperature control at 200°C begins. As soon as the copy cycle is completed, control is again switched to 190°C.

TH1 is positioned at a point 30.5 mm from the paper path reference position, thereby preventing offset caused by low temperature and degraded fusing performance for small-size paper.

The control temperature in the Energy Saving Mode is 155°C. With EP5000, the control temperature is 180°C in the Energy Saving Mode.

Fusing Thermoswitch TS1, installed above the Upper Fusing Roller, cuts off the power to the Fusing Unit if the temperature of the Upper Fusing Roller becomes excessively high. It eliminates the possibility of a fire that could occur when H1 remains ON due to a faulty temperature control circuit.



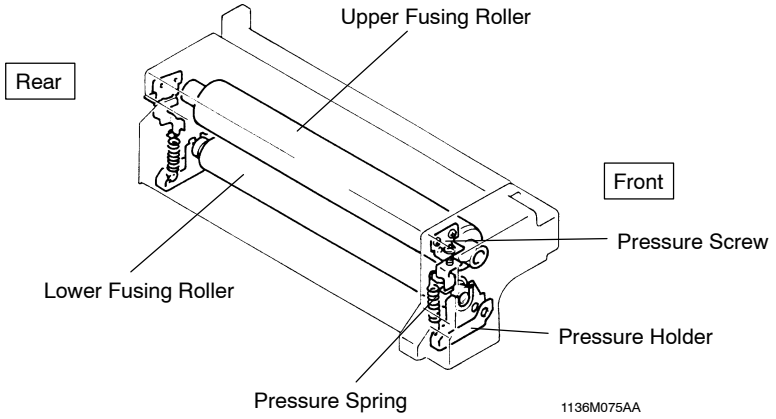
<Fusing Temperature Control During Continuous Small-Size Paper Feeding>

When a number of sheets of small-size paper are fed through the copier continuously, the temperature of the rear end of the Fusing Rollers tends to rise, resulting in a high-temperature offset occurring. Fusing Thermistor TH2 is installed at a location 271.5 mm from the position of paper passage registration. As soon as TH2 detects 225°C, the 225°C control by TH2 is started.

1156SBM2302A

23-2. Fusing Rollers Pressure Mechanism

Pressure springs are fitted to the Pressure Holder for the Lower Fusing Roller on the front and rear ends. When the pressure screws are tightened, it moves the Pressure Holder upward, thus allowing the Lower Fusing Roller to be pressed tightly up against the Upper Fusing Roller.



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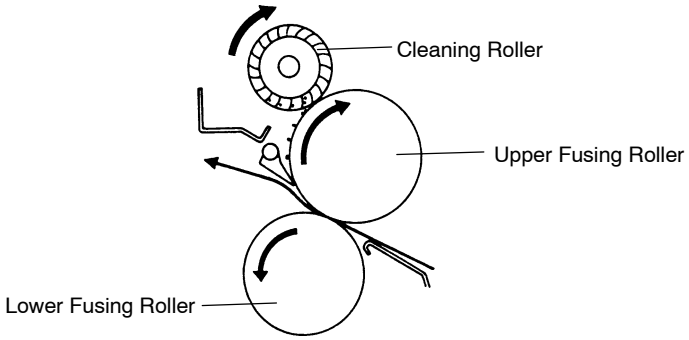
23-3. Oil Roller/Cleaning Roller

The Cleaning Roller is pressed up against the Upper Fusing Roller, applying a coat of silicone oil to the surface of the roller. At the same time, it turns in the direction opposite that of the Upper Fusing Roller and, with its brush, removes toner and paper dust.



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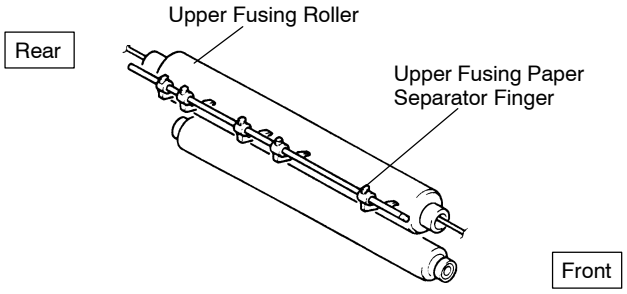
1156SBM2304A

23-4. Paper Separator Fingers

- Each of the two Fusing Rollers is provided with Paper Separator Fingers that strip the paper from the surface of the Rollers.

◆ Upper Fusing Paper Separator Fingers

- The Upper Fusing Paper Separator Fingers have been coated with teflon so that they will not be contaminated with toner.
- The tip of each Separator Finger is at all times pressed against the surface of the Upper Fusing Roller by a pressure spring.



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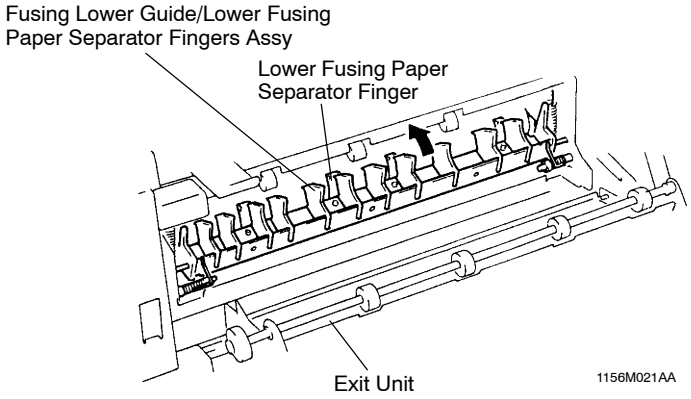
◆ Lower Fusing Paper Separator Fingers

- The Lower Fusing Paper Separator Fingers are flat springs to enhance paper separating performance and ensure that the paper would not become wedged if a misfeed occurs.



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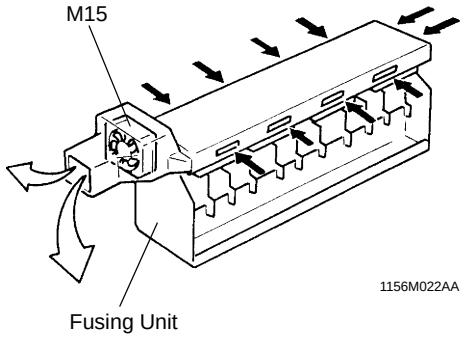
1156SBM2305A

23-5. Fusing Section Cooling Fan Motor

Fusing Section Cooling Fan Motor M15 prevents the temperature in the optical section from being raised inordinately by the heat of the Fusing Unit in the standby state. M15 remains energized while the copier is in the standby state and deenergized during a copy cycle.

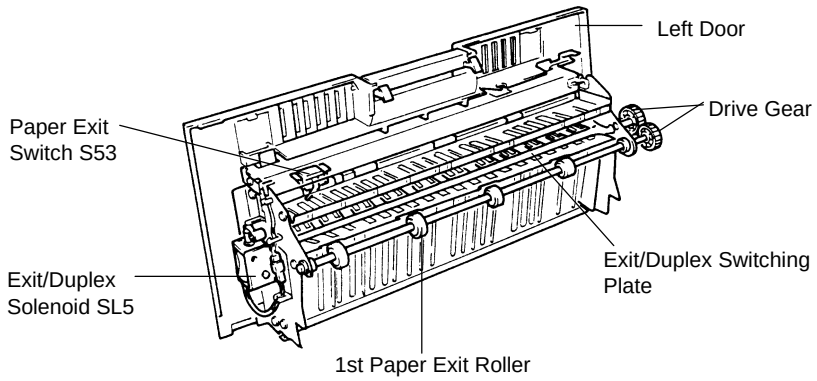


	Control Signal	ON	OFF	WIRING DIAGRAM
M15	PWB-A PJ10A-2	L	H	3-D

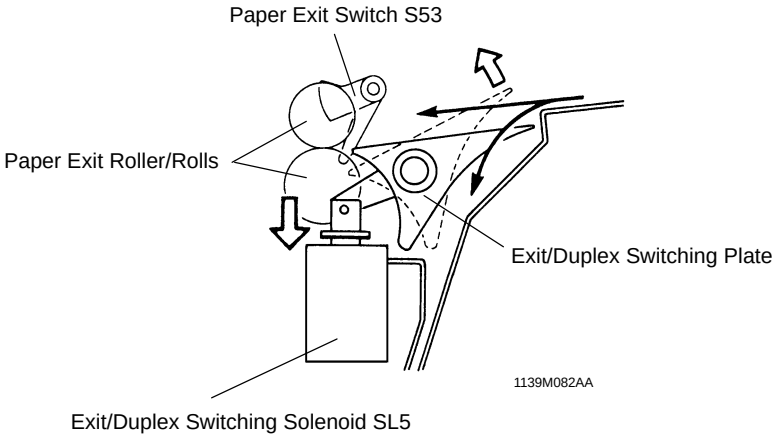
1156SBM2400A

24 EXIT UNIT

Drive from the Fusing Unit is transmitted via a gear train to turn the 1st/2nd Paper Exit Rollers.



Main Control Board PWB-A outputs a signal to energize Exit/Duplex Switching Solenoid SL5, which switches the position of the Exit/Duplex Switching Plate. The Unit has Paper Exit Switch S53 built into it which detects a sheet of paper being fed out of the Unit. (For more details of switching control, see the Service Manual for “DUPLEXING UNIT”).



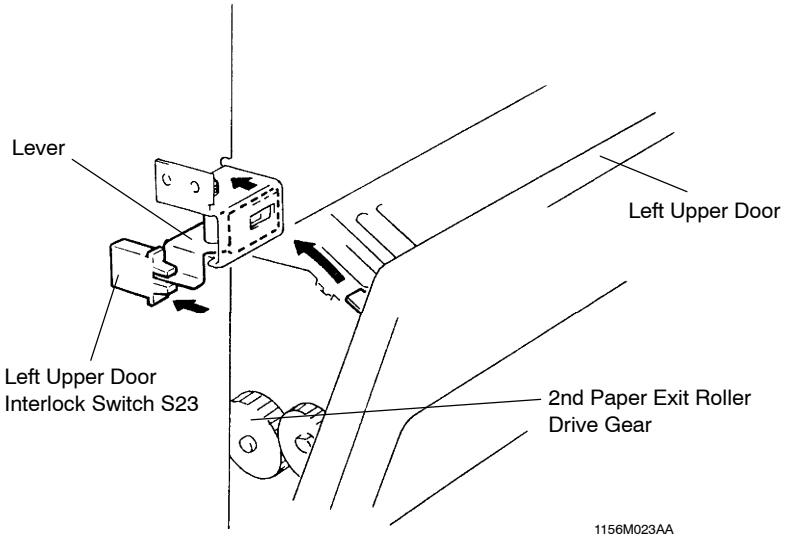
	Control Signal	ON	OFF	WIRING DIAGRAM
S53	PWB-A PJ14A-8	L	H	3-D

	Control Signal	Energized	Deenergized	WIRING DIAGRAM
SL5	PWB-A PJ14A-6	L	H	3-C

1156SBM2401A

24-1. Left Upper Door Interlock Switch S23

- Left Upper Door Interlock Switch S23 fitted to the copier body detects the Left Upper Door when closed. The Exit Unit is fitted to the Left Upper Door.
- When the Left Upper Door is closed, the rib on the Exit Unit pushes the Lever, which activates S23.



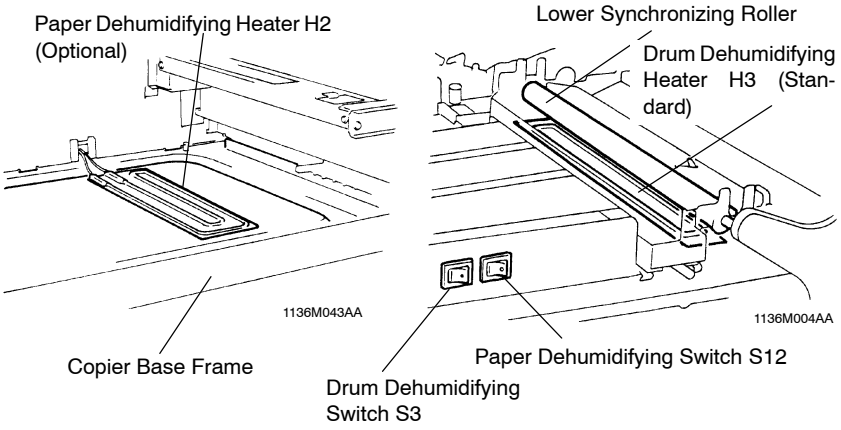
Controlled Part	Control Signal	ON	OFF	WIRING DIAGRAM
S23	PWB-A PJ16A-4	L	H	21-I

1156SBM2500A

25 DEHUMIDIFYING SWITCH

To prevent image transfer efficiency from being reduced due to damp paper in highly humid weather, Paper Dehumidifying Heater H3 (Optional) is installed on the base frame of the copier under the 2nd Drawer.

Drum Dehumidifying Heater H2 (Standard) is located under the Lower Synchronizing Roller to prevent the PC Drum from forming condensation.



● H2, H3 ON/OFF Conditions

	Dehumidifying Switch ON		
	Power cord Plugged in	**Power Switch ON**	***During a copy cycle**
H2	ON	OFF	OFF
H3	ON	ON	OFF

*During a copy cycle: Refers to the period of time between when the Start Key is pressed and when Main Drive Motor M1 is deenergized.

26 MEMORY BACKUP

IC1 (RAM) of RAM Board PWB-R connected to Main Control Board PWB-A stores the setting/adjustment values set in the Tech. Rep. Modes as well as the counter counts. Backup Battery BAT1 is mounted on PWB-R to prevent the contents of memory from being lost when the power cord is unplugged or PWB-R removed from the copier. BAT1 requires a voltage of 2V or more to retain the contents of memory.

Important

As we noted above, the RAM stores critical data. If PWB-R has been replaced with a new one, memory must first be cleared and then all settings be made again. It should also be noted that PWB-R should not be replaced at the same time when PWB-A is replaced.

1156SBG000E

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

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